

EUROPEAN ATLANTIC TURTLES

by

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N.B. Figs. 32-42, tables 1-17, and charts 1-8 have been inserted after the plates.

PREFACE

Preparations for the present paper started years ago, and repeatedly it was believed that the manuscript was almost completed. However, several times the manuscript had to be put aside for some time, and when a new chance to work upon it presented itself, it usually proved that new records had become available. These records had to be inserted, and from time to time the serial numbering had to be started all over again.

To all correspondents who helped me with information about records, and who helped me to trace eye-witnesses, I am extremely grateful. Their number is so large that it is impossible to include a complete list of names. Many of them have been cited, however, under the individual records.

The motives for starting upon this study were various. Naturally my interest was raised by turtles stranding on the Dutch coast. Discussions with the late Dr. H. W. Parker, British Museum (Natural History), about turtle taxonomy, about turtle distribution, and about the causes that might bring a turtle to cross the ocean, greatly stimulated me to undertake this study during its initial stages. The suggestion by the late Dr. K. P. Schmidt (1945) that open stretches of ocean might form a barrier to the distribution of turtles did not seem to fit in with turtles crossing the North Atlantic Ocean to come to Europe, and this was an extra stimulant to study the distribution of turtles.

Once the study was started, repeated visits to the British Museum (Natural History) were made to examine specimens, and the question arose how complete my lists of records really were. A renewed search of literature followed, and many records were added to the lists. To the staff of the British Museum (Natural History), especially to Miss A. G. C. Grandison and her collaborators of the Reptiles Section, and to Mr. M. J. Rowlands and the staff of the B.M.'s libraries I am greatly indebted for all the help that I received on my visits to the Museum.

Besides visits to the British Museum (Natural History), three trips were made to Museums in France, one trip to Jersey, and two trips to Spain, all with the object of searching for more information. The Foundation J. J. ter Pelkwijk Fund kindly provided grants for some of these trips.

One cannot very well study the origin of European Atlantic Turtles without paying some attention to turtles in other parts of the North Atlantic Ocean. Although no complete search for records was made, some information about the distribution of some species of turtle elsewhere in the North Atlantic Ocean is given in Appendices 1 and 2.

It is intended that the present paper will be followed by a survey of records of turtles observed in the open ocean, far from land. An attempt to include this survey in the present paper was given up. The result would have been a further delay in publication, with all the hazards of new records cropping up. Indeed some records became available during the last months. As it was impossible to renumber the records once more, the additional records were inserted between existing numbers by adding "bis " to the preceding number, e.g., 49 bis.

The drawings for the present paper were prepared by Messrs. W. C. G. Gertenaar, J. J. A. M. Wessendorp, and W. Bergmans; the photographs (except those of plates 6 and 8) have been made by Mr. Chr. Hoorn.

The manuscript such as it is published was completed on October 29th, 1971.

L. D. Brongersma.

INTRODUCTION

The object of the present paper is to list and discuss the records of turtles that have been observed in European Atlantic waters. For the present purpose European Atlantic waters may be defined (fig. 1) as being the eastern part of the North Atlantic Ocean, bordering upon European coasts, together with the seas, bays, channels, and estuaries connected to it, and extending from Iceland in the northwest and North Russia in the northeast to Punta Marroqui (Spain) in the south. In this way European Atlantic waters include the Barents Sea, North Sea, Baltic Sea, Irish Sea, British Channel, etc. The area is bounded in the west by the meridian of 25°W from the Arctic Sea southwards to 60°N , from there eastwards along the parallel of 60°N to the meridian of 11°W , and along the last-mentioned meridian southwards to 36°N , and eastwards along this parallel to Punta Marroqui. In these waters turtles have been observed repeatedly, and in some areas even more or less regularly, but these waters do not harbour a permanent breeding population of turtles. The Mediterranean Sea is not being dealt with, because this sea harbours breeding populations of turtles (Werner, 1894: 227; 1897: 21; Despott, 1915: 327; Bodenheimer, 1935: 460; Hirth & Carr, 1970: 3; Bruno, 1969: 12-13, fig. on p. 13; Dr. C. Lewinsohn, personal communication, 1966).

For practical purposes, and to facilitate the discussion, European Atlantic waters may be divided into three areas (fig. 1):

N: a northern area extending from Iceland and Northern Russia to, and including the island of Ushant (île d'Ouessant, France);

C: a central area extending from Ushant to Cape Finisterre (North-west Spain);

S: a southern area extending from Cape Finisterre along the coasts of Spain and Portugal to Punta Marroqui (South Spain).

To facilitate the referring in the text and tables to the individual records, symbols (De, Ud, Ca, etc.; see p. 27) are used to indicate the various species and groups of records, whilst within each group the records are numbered.

The fact that turtles are occasionally found in European Atlantic waters has been known for a long time. The earliest reference to an animal that may well have been a turtle dates from the 13th century (Thomas of Cantimpré, ca. 1233-1248, lib. VI: Zitiron); this record is discussed in the present paper under Ut 7. More conclusive information is given by Albertus

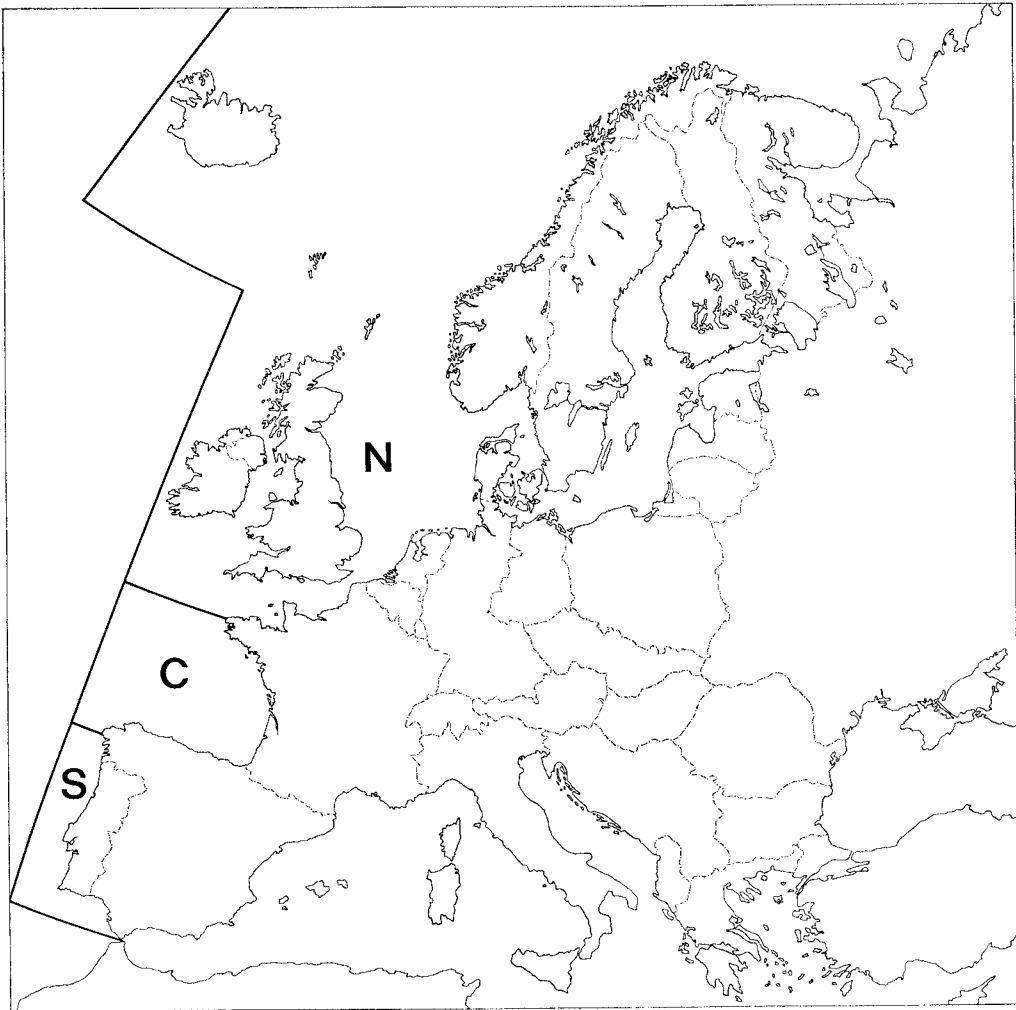


Fig. 1. Chart showing the delimitation of European Atlantic waters as used in the present paper. N, northern area; C, central area; S, southern area.

Magnus (1252, or after 1262; see Stadler, 1921: 1521, no. 19 Barchera, no. 126 *Tortuca maris*; present paper: Un 44, Un 46), and by Petrus Borchorius (ca. 1325; ed. 1731: 291; present paper: Un 47). In the Middle Ages (and even long after that) only a very few people living on the Atlantic coasts of northwestern Europe will have known what turtles looked like, and whenever and wherever a turtle appeared (especially if it were a large Leathery Turtle) it will have been classified as a sea monster, rather than

as a harmless turtle. In this way records of turtles may have passed into the literature on sea monsters and on 'the Great Sea Serpent' (Brongersma, 1968*f*). However, in the eyes of many people reports on 'the Great Sea Serpent' are highly suspect. As I do not wish to confuse the issue, I have not included in the list of records of *Dermochelys coriacea* those records of 'Great Sea Serpents' of which I believe that they may have been based upon sightings of the Leathery Turtle, but some of them are mentioned in the list of unidentified animals that may have been turtles (List VIII).

Since the early records of the 13th and 14th centuries, more than three hundred years elapsed before new turtle records were published. Sibbald (1684: 13; 1697: 193) and the Rev. James Wallace (1693: 14; 1883: 17) mentioned turtles having been found in Orkney, and Brand (1701, 1703: 116; 1809: 789; 1883: 174-175) recorded a turtle from Shetland. Many records have been added since that time. In the present paper 522 records are dealt with. These are distributed over the various species and countries as indicated in tables 1*a*, *b*. Not all records are equally reliable (see p. 26) and it might be argued that doubtful records could better have been left out. However, the present paper is intended to pass-on all information that became known to me, and the doubtful records included by me do show where further confirmation is needed. Others may succeed in obtaining confirmation of a record, where I failed to do so. Besides, it will be clear from the data mentioned for the individual records, which ones are open to doubt.

The number of 522 records does not necessarily imply that exactly 522 turtles have been observed. Some reports refer to the occasional occurrence of turtles in a certain area, without stating how many specimens were observed. Writing about Orkney, the Rev. James Wallace (1693: 14; 1883: 17) stated: "Sometime they find living Tortoises on the shore." From this statement it is clear that turtles were found in Orkney more than once, but as there is no indication at all about the actual number of turtles observed, the report has been counted as representing a single record. It has been suggested that one and the same turtle has been reported twice, thrice, or even four times (e.g., De 16 and De 17; De 21 and De 22; Un 3 and Un 4; De 26, De 27, and De 28; De 37*a-d*). The reasons for entering these observations as separate records are given in the discussion on the records of *Dermochelys coriacea*. The possibility that one and the same turtle was observed and recorded more than once cannot be wholly excluded. If in this way, on the one hand the number of records would be somewhat too high, on the other hand a compensation may be found in the records which will have been based upon more than one specimen (e.g., Ue 2).

The occurrence of turtles is mentioned in a variety of publications dealing

with the fauna of Europe as a whole, or with that of its various countries. In these faunal surveys, the remarks are restricted usually to the statement that turtles have been observed in the area. Sometimes one or more species are mentioned by name, but the individual records are not given. These are scattered throughout literature and they are often difficult to trace. However, in the past attempts have been made to survey all records from certain parts of European Atlantic waters. J. & H. Bouxin & Legendre (1931) listed French records of the Leathery Turtle, *Dermochelys coriacea* (L.), and Angel (1946: 181) also gave a list of French localities for this species. J. & H. Bouxin & Legendre (1931) listed fifteen records of *D. coriacea*; in fact they dealt with only thirteen records, for two specimens were entered twice, once as having been captured in 1871 and once as having been taken in 1872 (De 98, De 129). To-day 82 records of the Leathery Turtle are known from France, and of these 28 records date from before 1931. Duguay (1968) listed the records of *D. coriacea* from the waters of the Department of Charente-Maritime.

Taylor (1948: 10-11) enumerated 41 (39 on the chart on p. 26) turtles from Great Britain and Ireland, and in a revised version of his paper, Taylor (1963: chart 8) indicates 91 records. In the present paper 214 British and Irish records are dealt with. It would be wrong to conclude from these numbers that 123 turtles reached British and Irish waters since 1960, the latest year from which records are entered upon Taylor's (1963) chart. In the period 1961 to 1971 fifty-one records were added and, thus 72 records, not included by Taylor, date from before 1961. These 72 records came to light through correspondence and by searching literature. A direct comparison of the numbers of records for the various species, such as these have been indicated by Taylor, with the numbers of records mentioned in the present paper is somewhat difficult, as changes in identification play a part. Of the five records of *Eretmochelys imbricata* mentioned by Taylor in 1948, only three appear as such on his chart in 1963, but two new records are added. After examining the evidence for these records, I am far from convinced that *E. imbricata* has ever been found in British waters; of the records ascribed to *E. imbricata* by Taylor in 1948 and 1963 respectively, two must be referred to *Caretta caretta* (Ca 11, Ca 39), and five have been placed by me among the records of unidentified turtles that had been reported as having been Hawksbills by previous authors (Ue 1-Ue 4, Ue 11). Taylor's (1963: chart 8) record of *Chelonia mydas*, taken from a newspaper report, later proved to have been based upon a specimen of *Dermochelys coriacea* (De 63). The turtle observed off Noss Head was considered not identified by Stephen (1961: 44), and by Taylor (1963: chart 8), whilst I believe it to

have been a Leathery Turtle (De 12). Some specimens, which I include among the British records (e.g., De 11, De 30, De 44), were observed outside the territorial waters, and for that reason they may have been omitted by Taylor, although De 14, De 28, and De 47, which are also extraterritorial have nevertheless been included by Taylor. Moreover, the numbers of records included by me, may be somewhat flattered as I have counted as separate cases records that others believe to have been based upon one and the same turtle.

The interest in observations on turtles in European Atlantic waters was greatly stimulated by two events that took place in 1938. In September of that year, Deraniyagala (Editors, 1938; Deraniyagala, 1938a, b: *Colpochelys kempi*) showed that Kemp's Ridley, *Lepidochelys kempii* (Garman), occasionally reached European Atlantic waters. As if to prove Deraniyagala's words, a small invasion of turtles, including three Kemp's Ridelys, took place on British coasts towards the end of 1938 and in the beginning of 1939 (H. W. Parker, 1939a, b; Anonymus, 1939a-d). Since that time, data on turtles observed in British and Irish waters were brought together in a special "Stranded Turtles File" in the British Museum (Natural History), London. This museum also issued a pamphlet facilitating the identification of the species, and requesting the reporting of observations to the museum (Fraser & H. W. Parker, 1949, 1953; Brongersma, 1967a). Stephen (1953) reviewed the records from Scotland; Stephen (1961), and Stephen, Rae & Lamont (1963) published additions to this list.

Further, the interest was raised by turtles being found in countries where they had not yet been observed (at least not in the last century or two): Denmark (Hvass, 1950), Sweden (Berlin, 1949), Norway (Willgohe, 1953a, b; 1956; 1957; 1958; 1968; Holgersen, 1960a, b), Russia (Konstantinov, 1965), Iceland (Brongersma, 1968a: 28). A German record had been published already (Greve, 1931), and a second German record (De 72) was added recently. Brongersma (1961) dealt with the records from the Netherlands; Nobre (1935), Ladeira (1956), and Pissarro (1958) treated of turtles from Portuguese waters.

Besides these publications, there is a vast number of old and more recent papers, and newspaper reports in which the occurrence of turtles has been mentioned. Although the present paper is an attempt to review all the known data, I have no hopes that my lists of records are in any way complete. In the past years old records that had escaped my notice have kept cropping up, and there will be many more of which I have no knowledge. Some will have been published in newspapers, and therefore they are difficult to trace. Others will have been mentioned in books and journals that I did not consult. To find such records one should go through scores of books and through

series of journals, volume by volume, just on the off-chance that a turtle may have been mentioned. Indeed, some of the records were found in this way, but when it comes to books or journals that do not have an index, the search becomes a hopeless task. Some records will have been mentioned in letters, now kept in various archives. A letter written in 1939 by Mr. P. Enard, addressed to the Société des Sciences naturelles, La Rochelle, and found by Dr. R. Duguy in the files of the La Rochelle museum, is proof of this; it provided me with six records that I had not yet found elsewhere. One record was discovered by Prof. Dr. L. B. Holthuis, Leiden, as a manuscript note in R. Q. Couch's interleaved copy of J. Couch's "Cornish Fauna."

It will be clear that the lists of records published in the present paper could be prepared only with the help of many people. Repeated visits to the British Museum (Natural History), London, made it possible to consult the correspondence in the "Stranded Turtles File" and to search for records in publications not available to me at Leiden. Correspondence with many people in Great Britain, Ireland, France, Norway, Denmark, Spain and Portugal, brought to light further records as well as additional information on published records. Two trips along the French Atlantic coast, a visit to the island of Jersey (Channel Islands), and visits to Madrid, Santiago de Compostela, and San Sebastian (Spain) not only allowed me to check previous records, but it also supplied me with a number of unpublished data. It is hoped that readers of the present paper, who come across additional information with regard to records mentioned in my lists, or who get to know of new observations, will help to add to the survey, and that in years to come a more complete list of records will come into being by their joint effort. It may be stressed that reporting sighted or stranded turtles immediately may make it possible to obtain further information, allowing of a definite identification. This also pertains to accounts from newspapers. No zoologist can subscribe to all newspapers, let alone read them carefully. Therefore, clippings from newspapers dealing with turtles are always welcome; the sooner they are received by an interested zoologist, the better are the chances that additional information can be obtained.

However incomplete my list of records may prove to be, they may be of use to future authors, who will be able to check what is known with certainty, what is doubtful, what is new, and what has escaped the present compiler's notice. The lists may help to avoid erroneous statements, like that made by Coward (1927: 13, *Thalassochelys caretta*), who when recording a Loggerhead (*Caretta caretta*) from the river Lune (Ca 13) added the remark: "the species has not been previously recorded in the British Isles." Apparently, this author was oblivious of the fact that the species had been recorded already

from England in 1840 (Wilcox, 1840, *Testudo caretta*; Ca 20), and also from Ireland (Thompson, 1840a: 8; 1840b: 383, 406, *Chelonia caouana*; Ca 41, Ca 52). Prior to 1927 five specimens had been found in England, four in Scotland, and three in Ireland. When in 1947 a turtle was sighted off the Mull of Kintyre (Un 18), the "Sunday Express" (17.viii.1947) mentioned a zoo director as having said: "The last time a turtle was seen off the coast of Britain was at the beginning of this century." It seems to have escaped this zoo director's notice that a small invasion of turtles took place in the winter of 1938/1939, that between 1900 and 1946 thirty-eight turtles had been found in British waters (not counting one record from the Channel Islands and fifteen Irish records), and that of these eight had been recorded in the years 1945 and 1946.

In table 3a the records for the species have been divided into eight groups. The first group contains the records from the 13th century up to and including 1700; then follow five groups containing the records for five successive periods of fifty years; the seventh group contains the records from 1951 until 1971, and the eighth group contains the records of which no exact date is known, and which could not be placed with any of the other groups. The most striking feature is the very strong increase in the number of records in the 1901-1950 period and even more strongly in the 1951-1971 period. The records for *Chelonia mydas* have been entered in this table for the sake of completeness, but it may be pointed out that most of these records are not comparable to those of the other species; some of them are based upon jettisoned specimens, and some are doubtful as far as the identification is concerned. For the present I consider Cm 4 and Cm 20 the only records based upon specimens that reached European Atlantic waters on their own accord. A number of records, of which the exact year of observation is not known, could still be placed in one of the groups with some degree of certainty; e.g., De 51 mentioned by Pennant (1776a, b: 8) without indication of the year of capture has been placed in the 1751-1800 group as it is very probable that it was taken between 1769 and 1776. The two Loggerheads, Ca 60 and Ca 61, mentioned by De Selys-Longchamps (1842: 171) can be placed safely in the 1801-1850 group, etc. It must be stressed that the data for the Southern area (Spain and Portugal) are very incomplete. Loggerheads seem to be fairly common along the southern part of the Portuguese coast and this makes that only few of them have been recorded in literature; the number of Loggerhead records in tables 3a, b for the southern area does not give an accurate idea of the frequency of the captures of *C. caretta* in Portuguese waters.

In table 3b the data for the 1851-1970 period have been divided into groups

representing ten years each. In the northern area the number of records for *Dermochelys coriacea* has increased very strongly in the last two decennia (1951-1970); of the records for this species 77.8 per cent were obtained in the last twenty one years. On the other hand the number of records for *Caretta caretta* has decreased in the northern area in the last ten years (1961-1970). In the central area the number of records of the Leathery Turtle also shows an increase, especially in the last decennium (1961-1970). Nothing much can be said about the Loggerhead records from the central area, because no exact dates are known for the fifty Loggerheads taken in the Biarritz area between 1935 and 1965. Kemp's Ridley has not yet been found in the southern area.

For three species (*D. coriacea*, *C. caretta*, and *L. kempii*) the annual number of records from the northern area, in the period 1901 to 1970, and for *D. coriacea* and *C. caretta* also from the central area are represented graphically in figs. 32-34.

Various factors may have contributed to the increase in the number of records since the beginning of this century. A growing interest in natural history and easier means of communication will have contributed by more observations being passed on to zoologists and museums that are interested in the matter. The growth of the population of Western Europe and people having longer vacations will bring more people to the shores, and the chances that stranded turtles will be reported become greater. Also, the growth of the population has led to more extensive and more intensive fisheries. The more boats out at sea, the more chances there are that specimens of *Dermochelys coriacea* will be observed and captured. In his letter of September 19th, 1939, addressed to the Société des Sciences naturelles, La Rochelle, Mr. P. Enard expressed the view that the increasing use of motor vessels in fisheries may have caused an increase in the number of reports on turtles. When fishermen still largely used sailing craft, which were slow and not easy to manoeuvre, it was difficult to run down to an object seen at some distance. By using motor vessels, which have a higher speed and which are easier to handle, fishermen are enabled to take turtles by surprise.

Although all these factors will have contributed, it is difficult to believe that they alone are responsible for the increase in the number of records. Physical factors, e.g., a slight rise in the temperature of the surface water, may make it possible for turtles to reach more northern waters. Fluctuations over the years will cause more turtles to come to European Atlantic waters in some periods than in others. It seems that of recent years *Dermochelys coriacea* comes to our area more regularly than in many years gone by, and that this species and *Caretta caretta* penetrate farther to the north than they

have done for a long period. That turtles penetrated far to the north in the past is shown by two Norwegian records from the eighteenth century; one of these (Un 1) undoubtedly, and the other (Ut 3) probably was based upon a turtle.

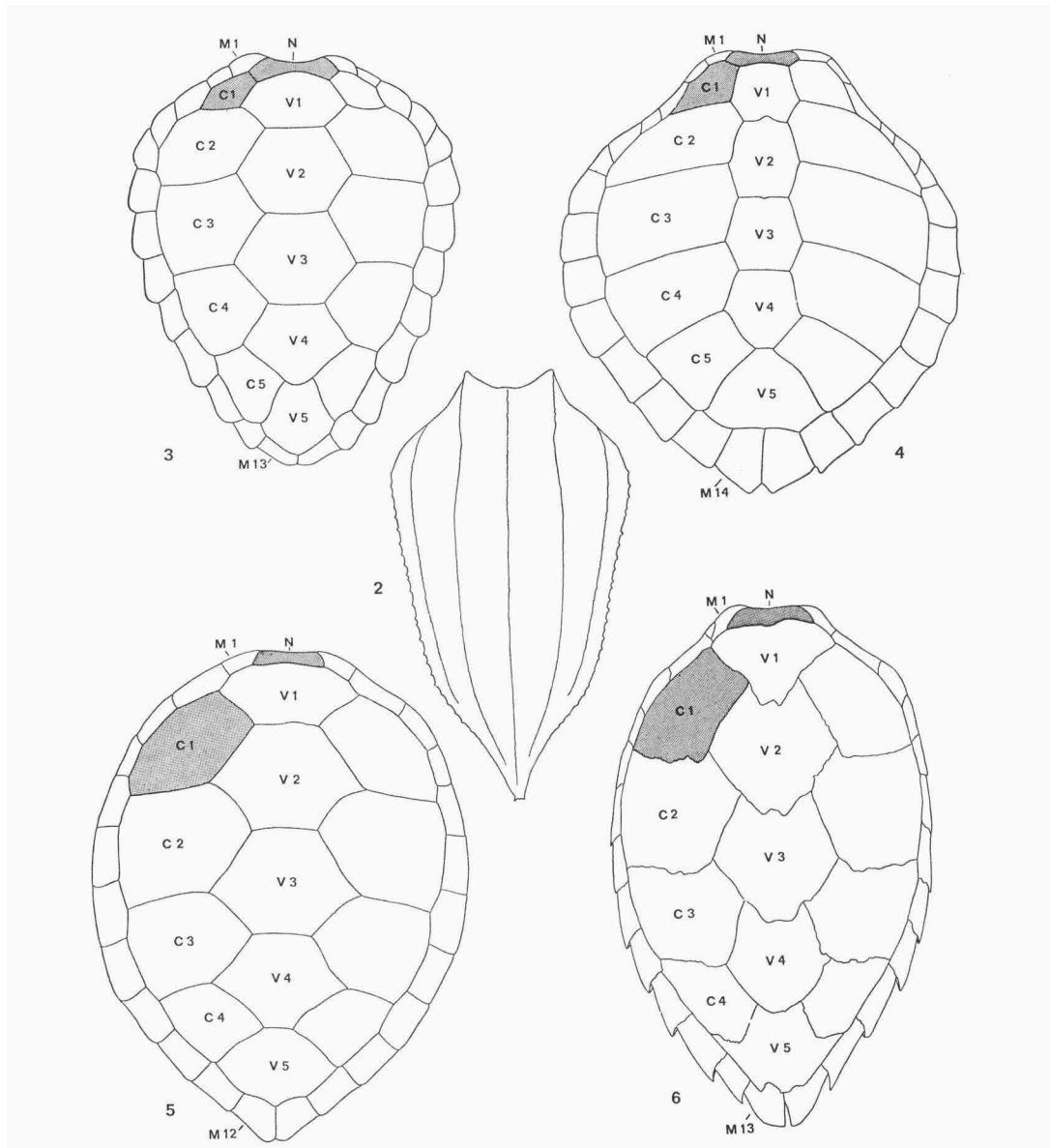
IDENTIFICATION

Five species of turtles have been reported as having been observed in European Atlantic waters, viz.,

- Dermochelys coriacea* (L.), Leathery Turtle or Luth;
- Caretta caretta* (L.), Loggerhead (Turtle);
- Lepidochelys kempii* (Garman), Kemp's Ridley;
- Chelonia mydas* (L.), Green Turtle;
- Eretmochelys imbricata* (L.), Hawksbill (Turtle).

These five species may be identified by using the following key, which is based upon young, half-grown, and adult specimens (but not on newly-born ones, which are not to be found in European Atlantic waters).

- 1a. Carapace covered with a thick, leathery skin, without horny scutes; carapace strongly tapering behind (fig. 2), with seven longitudinal keels (ridges), which may be smooth to distinctly notched. Upper jaw with three deep notches, one median and one on either side; the notches are separated from one another by tooth-like cusps (fig. 7). Blackish or brownish above (sometimes described as having a greenish tinge), often with scattered, small whitish or pinkish irregular spots; lower surface whitish, with black markings. Very large turtles, adult specimens reaching a total length of 275 cm (9 ft.) *Dermochelys coriacea* (Pls. 1-6)
- 1b. Shell covered with horny scutes 2
- 2a. Five costal scutes (C1-C5) on either side; nuchal (N) in contact with first costal (C1) (figs. 3, 4); two pairs of prefrontals (figs. 8, 12: pf), which may have one or more additional shields or scales wedged in between them (figs. 9, 10, 11); in the young and halfgrown each vertebral (V1-V5) shows a strong keel, knoblike or spinelike posteriorly (Pl. 9), which disappears when the specimen grows older 3
- 2b. Four costal scutes (C1-C4) on either side; nuchal (N) separated from the first costal (C1) by the first vertebral (V1) (figs. 5, 6); one pair (fig. 14) or two pairs (fig. 15) of prefrontals 4
- 3a. Four (rarely three) inframarginal scutes (IM1-IM4) on either side of the plastron; each inframarginal with a pore (p) at its hind border (fig. 23); carapace more or less roundish in outline, sometimes even slightly broader than long (measured in straight line); tomium (horny sheath) of lower jaw followed by one large inframandibular scale (Is) with a much smaller scale behind it (figs. 17, 19); colour greyish, brownish grey, or olive-greenish to blackish. Length of shell up to 70 cm (27½ in.) *Lepidochelys kempii* (Pl. 10)
- 3b. Three inframarginal scutes (fig. 22; IM1-IM3) on either side, without pores (sometimes four or five inframarginals are present, but then the numbers are usually different on the right and left sides); carapace distinctly longer than broad; tomium of lower jaw followed by a group of inframandibular scales (Is) of varying sizes (figs.



Figs. 2-6. Carapaces of: fig. 2, *Dermochelys coriacea* (L.); fig. 3, *Caretta caretta* (L.); fig. 4, *Lepidochelys kempii* (Garman); fig. 5, *Chelonia mydas* (L.); fig. 6, *Eretmochelys imbricata* (L.).

C, costal scutes; M, marginal scutes; N, nuchal scute; V, vertebral scutes.

- 16, 18); colour reddish brown. Length of shell up to 100 cm (40 in.) *Caretta caretta* (Pls. 7-9)
- 4a. Two pairs of prefrontals (fig. 15: pf); the scutes of the carapace are imbricate (except in very old specimens); the vertebrals (V1-V5) are more or less pointed behind (fig. 6); in the young and halfgrown specimens three low and narrow, more or less continuous keels are present (one on the vertebrals, and one on either side on the costals, converging posteriorly); tomium of lower jaw not serrated (fig. 21). Length of shell up to 92 cm (36 in.) *Eretmochelys imbricata* (Pl. 12)
- 4b. A single pair of prefrontals (fig. 14: pf); the scutes of the carapace do not overlap and they are not pointed behind (fig. 5). In the very young a trace of keels may be found, but already in the halfgrown these have disappeared; tomium of lower jaw with a strongly serrated margin (fig. 20); inner surface of horny sheath of upper jaw with vertical ridges, which are separated from one another by vertical grooves. Length of shell up to 140 cm (55 in.) *Chelonia mydas* (Pl. 11)

The four species with horny scutes (*C. caretta*, *L. kempii*, *Ch. mydas*, *E. imbricata*) show some degree of variation in the shape and in the number of these shields. During the growth of the specimen the shape of vertebral and costal scutes changes; this allometric growth is most evident in the second and third vertebrals, which at birth are distinctly wider than long, whilst in the adult they are distinctly longer than wide. Changes in the number of scutes concern partial or complete fusion of adjoining scutes, or the scutes may show fragmentation.

In some specimens of *Caretta caretta* the two pairs of prefrontals form a median suture (fig. 8), but more often than not additional scutes or scales are wedged in between the prefrontals. Sometimes a single azygous scute (fig. 9) or two or more scales are surrounded by the two pairs of prefrontals (fig. 11); sometimes a single azygous scute is present between the prefrontals of the posterior pair, completely separating them, and thus bringing the number of prefrontals up to five: an anterior pair and a posterior transverse row of three shields (fig. 10). As far as my experience goes this variation does not occur in *Lepidochelys kempii*, nor in *Eretmochelys imbricata*.

Variations in the number of costal and vertebral scutes are not very common, at least not in halfgrown and adult turtles. It is true that a wide range of variation has been described in embryos and hatchlings of *Caretta caretta* (e.g., by Coker, 1910: 46-67, pl. xi figs. 55-62, pl. xii-xiv), but it must be borne in mind that the embryos and hatchlings developed under somewhat unnatural conditions (eggs transplanted to artificial nests, or placed in incubators, and it is doubtful whether the abnormal embryos would ever have hatched. Moorhouse (1933: 12-14, fig. 1) described and figured variations in the scutes of the carapace of *Chelonia mydas*, and Grant (1956) remarked upon abnormal *Eretmochelys imbricata*, but again embryos or

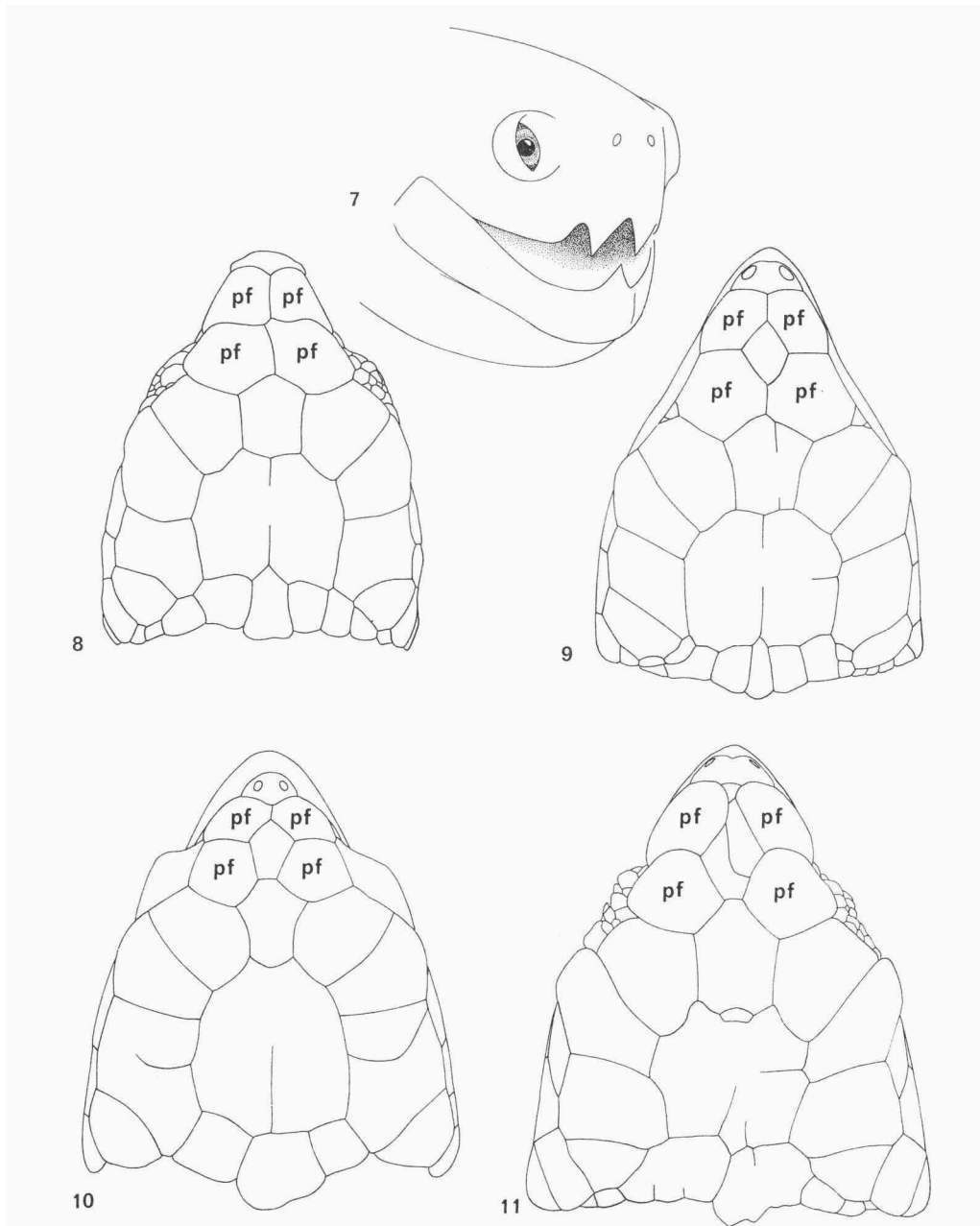
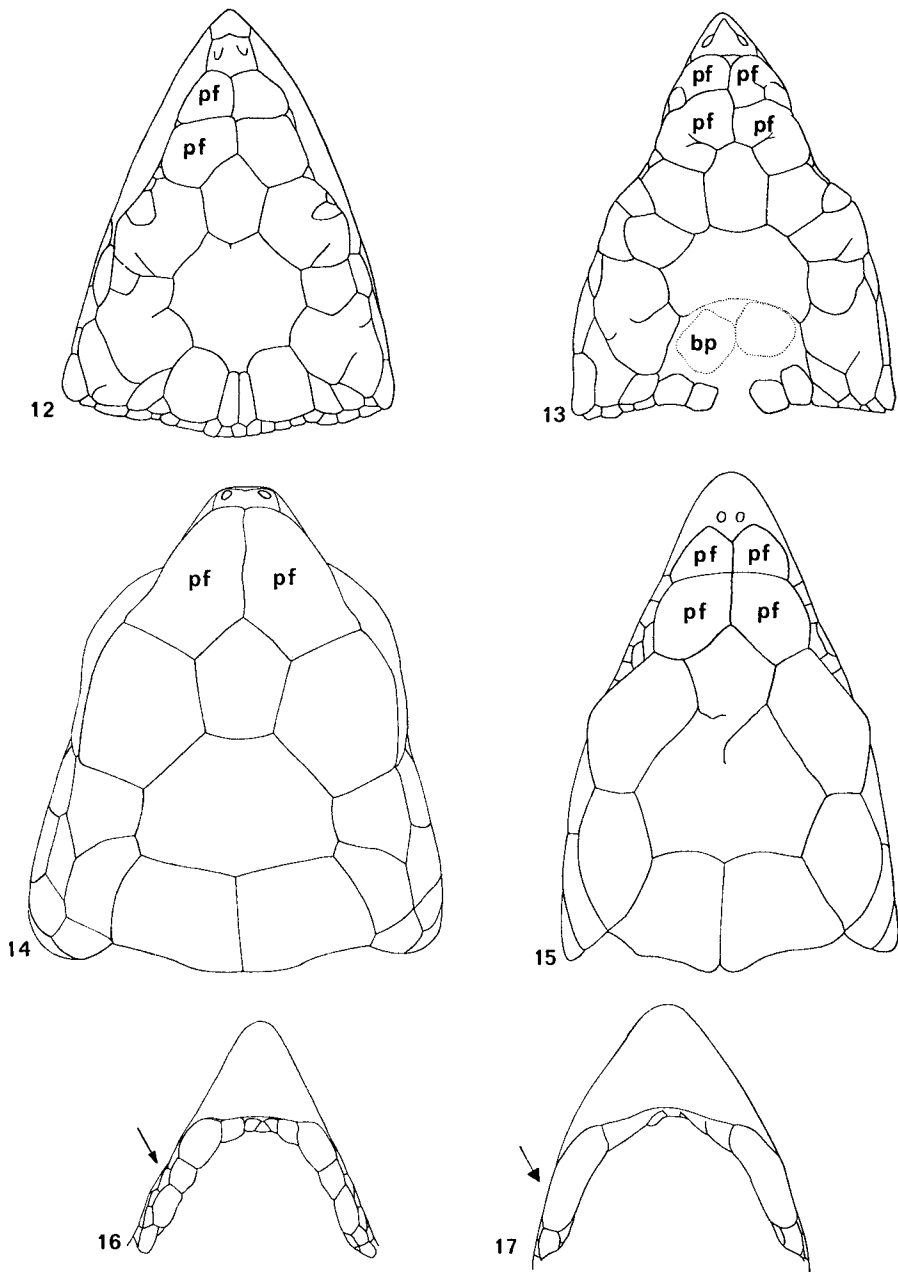


Fig. 7. *Dermochelys coriacea* (L.). Figs. 8-11, *Caretta caretta* (L.), scutes on upper surface of head; pf, prefrontals.



Figs. 12-15. Scutes on upper surface of head; figs. 12, 13, *Lepidochelys kempii* (Garman); fig. 14, *Chelonia mydas* (L.); fig. 15, *Eretmochelys imbricata* (L.).

pf, prefrontals; bp, pits caused by barnacles.

Figs. 16-17. Lower view of lower jaw of: fig. 16, *Caretta caretta* (L.); fig. 17, *Lepidochelys kempii* (Garman); the arrow points to the inframandibular scales.

hatchlings were dealt with. The majority of deviations from the normal number of costals concerns a higher number of scutes than is usually to be found in the species. A reduction in the number of costals is decidedly more rare. A juvenile *Caretta caretta* with four costals on the left side was examined by me in the Museo Naval y Aquarium in San Sebastián (Ca 138). The "Perfect Loggerhead Sea Turtle specimen" photographed by Frank Reid (and the photograph mounted on another background), shown on the cover of The International Turtle and Tortoise Society Journal (vol. 1, no. 5, July/August 1967) has only four costals on the right side; whether the number on the left is also four, or the normal five cannot be seen in the photograph.

It seems that very few hatchlings that show important deviations from the normal number of scutes do survive, at least halfgrown and adult specimens with supernumerary scutes are but rarely present in museum collections. This does not necessarily mean that the deviations from the normal number of scutes are lethal, but they may be the external evidence of abnormal development (caused by external, physical circumstances), which may have affected internal organs and that the abnormal development of these organs is lethal.

A variation that is not uncommon in *Lepidochelys kempii*, and that is also met with in *Caretta caretta*, is the presence of a small extra vertebral scute, bringing the total number of vertebrae up to six. Of *Caretta caretta* and of *Lepidochelys kempii* specimens are known, which have six costal scutes on one side and the normal five on the other side and, more rarely, specimens with six costal scutes on either side. Boscá (1916: 448, *Chelone mydas*) described a Green Turtle from Spanish Mediterranean waters, which had five pairs of costals instead of the normal four pairs. From Surinam I have examined a Green Turtle with seven costals on the left and five costals on the right side (Brongersma, 1968b: fig. 2).

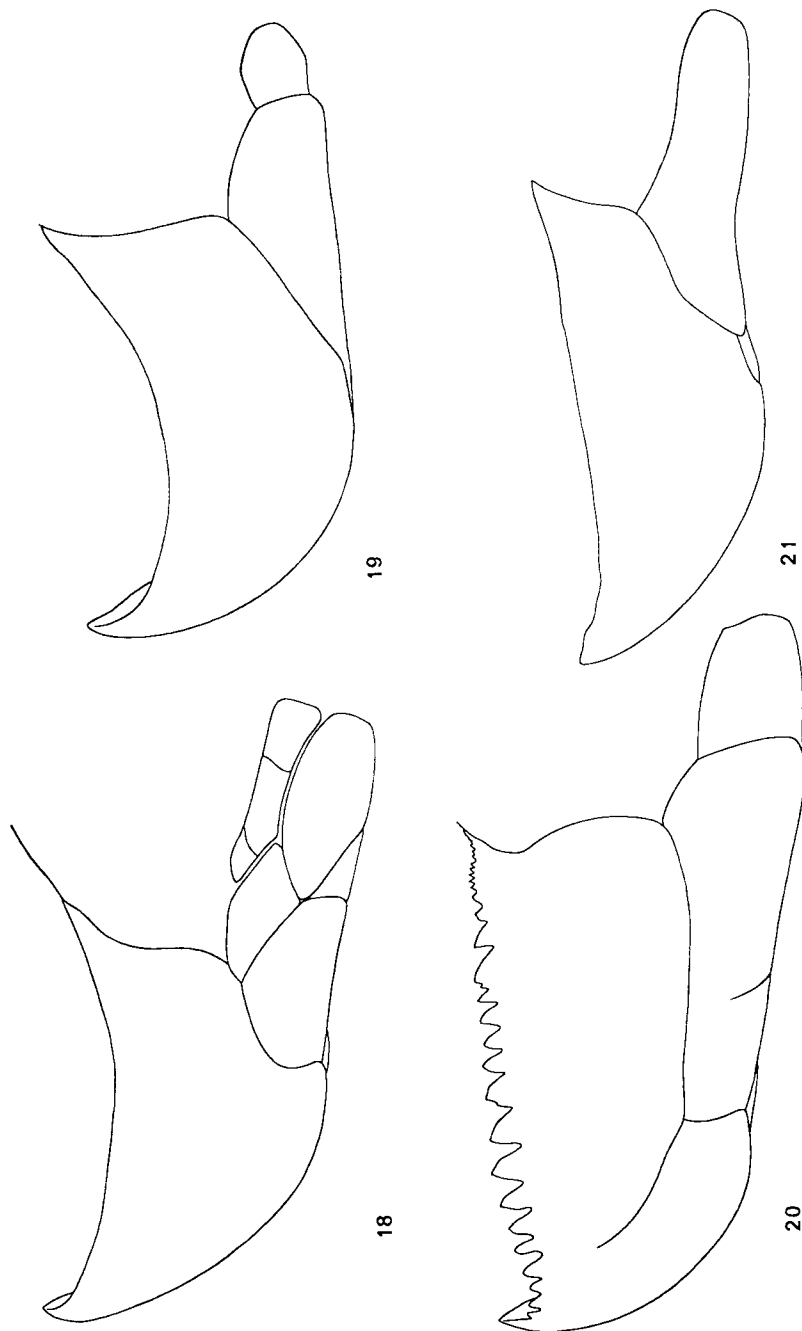
Notwithstanding the variability of the number of costals mentioned above, their number as indicated in the key (five pairs for *C. caretta* and *L. kempii*; four pairs for *Ch. mydas* and *E. imbricata*) can be considered as characteristic of the species. To arrive at a definite identification the other characters must be taken into account as well. In the past, when in keys the characters of *Caretta* were mentioned, it was often stated that the number of costal scutes is five or more in this genus. Such statements are not based on the possible presence of supernumerary scutes, such as these have been referred to above, but they date from the time that *Lepidochelys olivacea* (Eschscholtz) was considered a species of the genus *Caretta*, and sometimes even to be a synonym of *Caretta caretta*. In *Lepidochelys olivacea* the numbers of verte-

brals and of the costals of either side varies from 5 to 9 (usually 6 to 9). Writing at a time when most authors did not distinguish between *C. caretta* and *L. olivacea*, Gadow (1899a, b: *Thalassochelys caretta*) compared hatchlings of *L. olivacea* with halfgrown and adult specimens of *C. caretta*. Believing the specimens to belong to one species, he concluded that these turtles started life with a high number of costals and vertebrae, and that this number was gradually reduced to five pairs of costals and five vertebrae during the growth of the individual. De la Cépède (1788a: Explication de quelques planches: 17, and: 58, note e; 1788b: 75-76, note e; 1799: 24, note e) believed that in the Green Turtle the number of scutes of the carapace increased by one or two with increasing age; this belief was based upon information received from the Chevalier de Widerspach who served as an officer in French Guyana. It may be that in this instance *Chelonia mydas* was confused with *Lepidochelys olivacea*, both species occurring and breeding in the same area.

Lepidochelys olivacea (Eschscholtz) does not occur in European Atlantic waters; it is a species from the Indian and Pacific Oceans, and it also occurs on both sides of the Atlantic (West coast of Africa, the Guyanas, Venezuela, and Trinidad). Some authors consider *L. kempii* to be a subspecies of *L. olivacea* (e.g., Mertens & Wermuth, 1960: 71; Wermuth & Mertens, 1961: 242); if people when referring to Kemp's Ridley do mention only the specific name, and not the subspecific one (cf. Praeger, 1950: 206, *Lepidochelys olivacea*) the erroneous impression is given that *L. olivacea* in the strict sense is a visitor to European Atlantic waters.

The characters of the various species have not always been clearly defined, and this may have led to erroneous identifications.

Many authors (e.g., Deraniyagala, 1939b; Pope, 1939: 258; Carr, 1942: 4, 59; 1952: 343; Mertens, 1952, 1960b, 1964, 1968a: 24; Mertens & Wermuth, 1960: 68; Wermuth & Mertens, 1961: 231; Terent'ev, 1965: 165, 166) use the number of inframarginals as one of the characters to distinguish *Lepidochelys* (stated to have four inframarginals on either side) from *Caretta* (stated to have three inframarginals on either side). As discussed by me in a previous paper (Brongersma, 1961: 3-4, 18), the number of inframarginals is subject to some variation in *Caretta caretta*. Therefore, a specimen with four inframarginals need not necessarily belong to *Lepidochelys*, because this number may also be found in the Loggerhead. Also the opposite occurs. Cadenat (1957b: 1372, 1373, 1374) reports upon a specimen of *Lepidochelys olivacea* from Senegal that has three inframarginals on either side, and he adds that Carr (in litt.) informed him about another specimen with three inframarginals. De Sola (1931: 137, fig. 2) figured a specimen of *Lepido-*



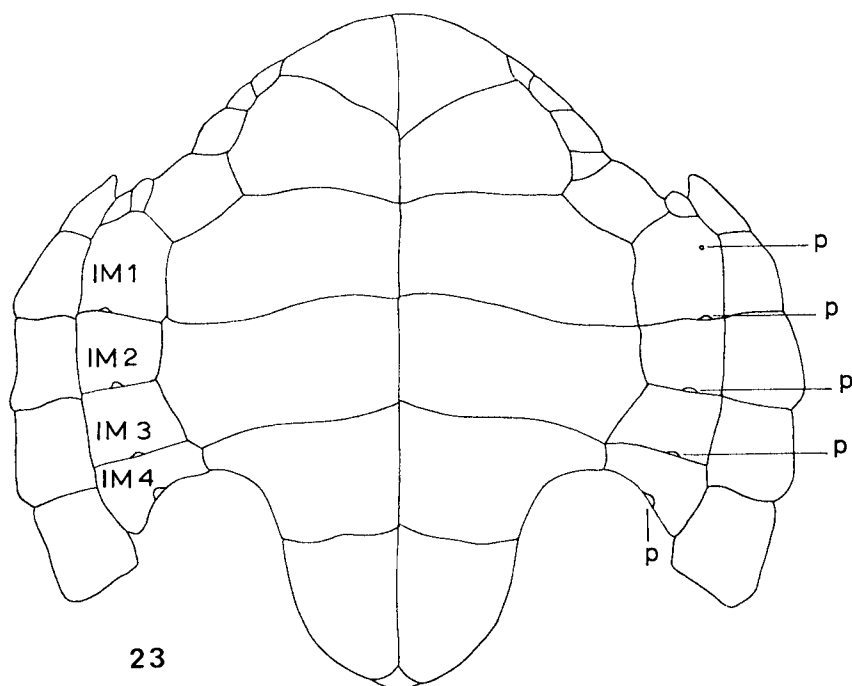
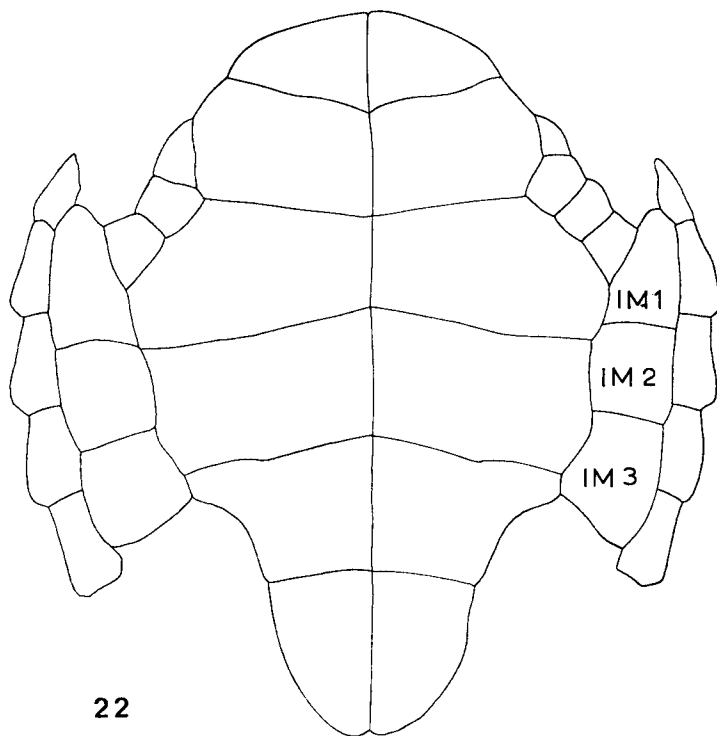
Figs. 18-21. Tomium (horny sheath) of lower jaw inframandibular scales of : fig. 18, *Caretta caretta* (L.) ; fig. 19, *Lepidochelys kempii* (Garman) ; fig. 20, *Chelonia mydas* (L.) ; fig. 21, *Eretmochelys imbricata* (L.).

chelys kempii with three inframarginals on one side, and four inframarginals on the other side.

Pope (1939: 258), Carr (1942: 4), and Wermuth & Mertens (1961: 242) state that the inframarginals of *Lepidochelys kempii* are devoid of pores. Later, Carr (1952: 398) remarks that in *L. kempii* each inframarginal is "usually pierced by a pore near the posterior seam." In the specimens of *L. kempii*, which I examined myself, pores are present. The anterior inframarginal may have a pore in its centre and one at its posterior border; the other inframarginals show only a pore at their posterior border. The presence of inframarginal pores I consider a distinctive feature of the genus *Lepidochelys*, occurring in both species (*L. olivacea* and *L. kempii*). In *Caretta caretta* inframarginal pores do not occur.

A further character mentioned by some authors (e.g., Pope, 1939: 258; Wermuth & Mertens, 1961: 242) as being characteristic of *L. kempii* would be the presence of three claws on the fore flippers. It may be that *L. kempii* sometimes shows three claws, but Garman (1880: 124, *Thalassochelys kempii*) in the original description of the species mentioned only two claws, and this is also true for the specimens examined by me.

A difficulty that earlier authors may have met with, when reporting on turtles observed in British waters, may have been the lack of adequate literature. In Th. Bell's (1838, 1849) "British Reptiles" only the Leathery Turtle and the Hawksbill are described, figured, and recorded from Great Britain. The chances are that in that period someone using this book will have referred any turtle with horny scutes to the Hawksbill, rather than considering the possibility that the specimen might belong to a species not previously recorded from the area. Confusion may also be caused by publications giving figures of incorrectly identified specimens. De Sola (1931: 138, fig. 3) gives a figure of a fully adult Green Turtle (with four costals) as being that of a Loggerhead. Tressler & Lemon (1951: fig. 31-1) figure three turtles, which are said to be a Green Turtle, a Hawksbill, and a Loggerhead respectively. The last-named turtle has been correctly identified, but the other two cannot be the Green Turtle and the Hawksbill, because the figures distinctly show that these two turtles have five pairs of costals. The broad, round shape of the shell of the so-called "Green Turtle" shows the figure to represent a *Lepidochelys*. The figure of the "Hawksbill" I would not like to identify, it may be either a *Caretta* or a *Lepidochelys*. Anonymus (n.d.b: fig. on p. 772) figures a Hawksbill under the name *Thalassochelys caretta*. Even the International Turtle and Tortoise Society Journal has difficulties with identifying turtles; twice a photograph of a Hawksbill is given under a false name; in an article by J. B. Murphy (1968: 6, fig.) the caption reads: "Loggerhead



Figs. 22-23. Plastron and inframarginals of : fig. 22, *Caretta caretta* (L.);
fig. 23, *Lepidochelys kempii* (Garman).

sea turtle, *Caretta c. caretta*", and in an article by Mittermeier (1971: 23, lower figure) the caption says: "this young green turtle..." and on p. 24 this turtle is named *Chelonia mydas*. Like Ditmars (1936, 1951: 384), Tressler & Lemon (1951: 661) state the Hawksbill to be the smallest turtle, but no comparison is made to Kemp's Ridley (Tressler & Lemon, 1951: 661, *Thalassochelys colpochelys kempii*), which according to current opinion remains smaller than the Hawksbill.

The systematics and nomenclature of turtles have been rather confused for a long time. When Linnaeus (1758: 197) described his *Testudo caretta*, he confused at least two species (the Loggerhead and the Hawksbill). The specific name *caretta* is derived from the French "caret" (Spanish "carey"), which in its turn will have been derived from a Caribbean word for tortoise-shell, the material taken from the Hawksbill (*Eretmochelys imbricata*) and not from the Loggerhead to which we to-day apply the name *Caretta caretta*. It is not to be wondered that some of the earlier authors believed the origin of the name to be of importance and that they used *caretta* for the Hawksbill (e.g., Daudin, 1801-1802: 39, *Testudo caretta*). The situation became even more confused when the generic name *Caretta* came into use. Bonaparte (1836: 9) used this name for the subgenus and Gray (1844: 53; 1855: 74; 1870: 119, *Caretta imbricata*) for the genus containing the Hawksbill, whilst for the Loggerhead the name *Caouana caretta* was used (Gray, 1844: 52; 1847: 133; 1855: 72; 1870: 118; 1873a: 89). Although in Great Britain one has two distinct vernacular names: Hawksbill for *Eretmochelys imbricata* and Loggerhead for *Caretta caretta*, other countries are not as lucky; in the Netherlands, Germany, and the Scandinavian countries one has to use 'true caret turtle' for the Hawksbill, 'false caret turtle' for the Loggerhead, and if one forgets to add 'true' or 'false' confusion arises.

All these points (insufficient knowledge about the variability of some characters, confusion in systematics and nomenclature, lack of adequate literature, figures of erroneously identified turtles) must be taken into account when dealing with the records.

Linnaeus was not the only person to confuse the Hawksbill and the Loggerhead. Some later authors also confused these species, and other species as well. The name Hawksbill is derived from the shape of the jaws, but jaws resembling the bill of a hawk (or perhaps even more that of a parrot) also occur in the Loggerhead and in Kemp's Ridley. Around Beaufort, North Carolina, this has led to using the name hawksbill for Kemp's Ridley (Coker, 1906: 57: *Thalassochelys, Colpochelys, kempii*). In Europe Hawksbill, Loggerhead, and Kemp's Ridley were sometimes confused. Five specimens originally reported as having been Hawksbills, proved to be Loggerheads (Ca 11,

12, 28, 30, 39), and three supposed Hawksbills proved to be Kemp's Ridleys (Le 3, 6, 15). If some people found it difficult to distinguish between the Hawksbill on the one side and either the Loggerhead or Kemp's Ridley on the other side, it proved to be even more difficult to discern between the Loggerhead and Kemp's Ridley.

Loggerhead and Kemp's Ridley are somewhat alike, both having five pairs of costal scutes and two pairs of prefrontals. Therefore, it is not to be wondered that sometimes these two species have been confused. Besides, it must be remembered that Kemp's Ridley was described as a distinct species only in 1880 (Garman, 1880: 123), and that it was not until 1938 that European specimens were recognized as belonging to *L. kempii* (Deraniyagala, 1938a, b). When dealing with *Caretta caretta* and *Lepidochelys kempii* from British waters, Fraser & H. W. Parker (1949, 1953: 41, 42) suggested that a number of records of the Loggerhead in fact might have been based upon Kemp's Ridley. From a renewed survey of the British and Irish records of the Loggerhead, it becomes clear that if there are still any records of Kemp's Ridley among those attributed to the Loggerhead, their number will be very low. In the course of time four specimens that originally were said to have been Loggerheads were referred to *L. kempii*, viz., Le 11, 13, 19, 20; for the first three this was based upon re-examination of the specimens, for the fourth (Le 20) the description definitely points to the specimen having been Kemp's Ridley. Of the remaining fifteen British and Irish records from before 1938 and ascribed to *Caretta caretta*, the identification of seven records of which the specimens had been preserved (Ca 8, 13, 14, 35, 42, 44, 46) was confirmed by re-examination. In eight instances the specimens were no longer available (Ca 5, 11, 12, 20, 26, 27, 30, 41). However, the description of two of these specimens (Ca 11, 12) clearly shows them to have been based upon *Caretta caretta*; of one specimen (Ca 20) the measurements definitely show it to have been *C. caretta*; of two specimens (Ca 26, 30) photographs are available, and in both instances I am convinced that these turtles were *C. caretta* too. Thus, of only three (Ca 5, 27, 41) out of fifteen specimens included under *C. caretta* in the present paper, and of one unidentified specimen (Uca 1), which at one time was said to have been a Loggerhead, there is no definite evidence that they indeed were Loggerheads. These four records date from before the time that *L. kempii* was first stated to occur in European waters, and two (Ca 41, Uca 1) date from before the year in which *L. kempii* was described. It appears highly unlikely to me, that these four specimens all will have been Kemp's Ridleys.

Records actually based upon specimens of *C. caretta* and *L. kempii* respectively will make up most of the records of unidentified turtles (List VII),

and most, if not all of the records of turtles that at one time have been referred to the Hawksbill, but of which the identification as such is considered extremely doubtful and probably erroneous (List VI).

It is more remarkable that the Leathery Turtle has sometimes been recorded as being the Green Turtle. Most of the earlier authors referred to the Leathery Turtle captured off Dieppe in 1752 (De 76) as being a Green Turtle, and the same happened with the Leathery Turtle taken in the Pertuis d'Antioche (De 124). Even still in 1959 a Leathery Turtle captured at Inishgallon (off Achill Island) (De 63) was reported in the press to have been a Green Turtle.

That some remarkable errors in identification are sometimes made, may be shown by two examples. In 1905 a "turtle" was found in the Zuyder Sea. Anonymus (1905*b*) who did not examine the specimen, jumped to the conclusion that it was a juvenile Leathery Turtle. Mr. V. van Laar (in litt.), who traced the specimen, could show that it was not a turtle at all, but some kind of tortoise (see IX). Another example, although not based upon a specimen from the region dealt with in the present paper, is equally amusing. Stolk (1957: 5, 6, 2 figs.) described, figured, and identified a juvenile Pond-Tortoise (*Emys orbicularis* (L.)), found on the Adriatic coast of Italy, as being a juvenile *Caretta caretta*!

THE RECORDS

Of many specimens recorded in literature, there is no doubt as to which species they belong. In a number of cases, the original report mentions characters, which allow of an identification being made. In other instances the specimens have been preserved and the identification has been checked at one time or another. Some records have been accepted at their face value. As an example of such a record, the one of a Leathery Turtle observed in Falmouth Harbour in 1835 may be mentioned. In an interleaved copy of J. Couch's "Cornish Fauna", once the property of his son R. Q. Couch, the species have been given numbers, and opposite no. 1, the Coriaceous Turtle, a hand-written note has been added: "1. a specimen was seen in Falmouth harbour 1835." As *Dermochelys coriacea* is an easily recognizable species¹⁾, I have accepted this record as reliable, although in fact no pertinent information is given, which would allow of the checking the identification. In the same class come some old records of *Caretta caretta* (e.g., Ca 5, 27, 41, 55), which were published at a time when *Lepidochelys kempii* was not yet known to reach

1) It is true that sometimes specimens of *D. coriacea* have been reported as being Green Turtles (De 63, 76, 124), but I do not know of any case in which one of the other species has been erroneously reported to have been a Leathery Turtle.

European Atlantic waters, or even at a time when *L. kempii* had not yet been described (Ca 41, 55). As has been mentioned already there is, of course, a small chance that one or more of these specimens could have been *L. kempii*, but I do not believe that there is any gain in placing them with the unidentified specimens, or with the doubtful records.

There are, however, also a number of records, of which the identification is uncertain. In some instances previous authors have made an identification, which is not substantiated by the evidence of the original report. An example is the record of an immense turtle, the largest the observers ever saw, which was sighted about two miles from Penberth Cove, Cornwall (Anonymus, 1839). J. Clark (1906: 307, *Sphargis coriacea*) considers it to have been probably a Leathery Turtle, but the vague remarks about its size do not allow of an identification and I have placed this record (Ud 5) with those unidentified turtles that may have been *D. coriacea*. The fact that Leathery Turtles were observed in Carmarthen Bay in August and October 1966 makes it not impossible that an animal seen a few weeks previously (July 1966) in the river Towy also was a Leathery Turtle, but there is no certainty of this. Sometimes there is circumstantial evidence that may make an identification probable. In February, 1934, three dead Green Turtles (*Ch. mydas*) were washed ashore on the Dutch coast, evidently jettisoned from a ship (Cm 3, 5, 6). It is considered highly probable that a fourth turtle, which was found at about the same time elsewhere on the Dutch coast, was also a Green Turtle, but of this no definite proof could be obtained. This specimen has been placed by me with the unidentified turtles that may have been Green Turtles (Ucm 2). Sometimes it is clear from the original report and subsequent literature that the identification by previous authors is due to an error or to a misunderstanding (e.g., Un 40), whilst there is no definite information as to which species was observed and the specimen must be considered not to have been identified.

At one time it was intended to place all records based upon specimens of which no definite identification is possible for lack of sufficient information, or of which previous identifications appeared to be erroneous (or at least very doubtful), in one single list of unidentified turtles. However, there were also objections to such a procedure. In the first place there seemed to be little use in completely severing the connection with previous literature. In the second place it seemed worth while to indicate, where possible, to which species the unidentified turtles probably or possibly might belong. Therefore, the records have been grouped in eleven lists as follows (in heavy type the symbols are indicated that are used in the text and tables to indicate the various groups and the individual records belonging to them):

- I A, *Dermochelys coriacea* (L.), Leathery Turtle: **De**;
- I B, Unidentified turtles, which probably were *Dermochelys coriacea*: **Ud**;
- II A, *Caretta caretta* (L.), Loggerhead (Turtle): **Ca**;
- II B, Unidentified turtles, which may have been *Caretta caretta*: **UCa**;
- III A, *Lepidochelys kempi* (Garman), Kemp's Ridley: **Le**;
- IV A, *Chelonia mydas* (L.), Green Turtle: **Cm**;
- IV B, Unidentified turtles which probably were *Chelonia mydas*: **Ucm**;
- V A, *Eretmochelys imbricata* (L.), Hawksbill (Turtle): **Er**;
- VI, Turtles, which in literature, or in correspondence, have been recorded as having been Hawksbills, but of which the identification (almost) certainly is incorrect: **Ue**;
- VII, Unidentified turtles, which could not be placed in any of the preceding groups: **Un**;
- VIII, Unidentified animals, which may have been turtles: **Ut**;
- IX, Tortoise, erroneously recorded as a Leathery Turtle.

As far as possible I have tried to go back to the original, published source for each record. This I believe to be important. Many authors have mentioned the capture of the Leathery Turtle off the Cornish coast in 1756, most of them writing about one specimen, a few mentioning two turtles, but none of them mentioning the actual locality and date. Only by going back to Borlase's account (1758: 285), these two Cornish records (De 48, De 49) could be plotted on a chart.

An attempt has been made to trace the exact locality where the observation was made. Cornish (in: Couch, 1878: 30, note) mentions a large turtle having been sighted off the Wolf Rock, and J. Clark (1906: 307) places the event near Land's End. The original report (Anonymus, 1839) states that the turtle was sighted about two miles from Penberth Cove by the Trinity buoy yacht, which was returning from the Wolf Rock. These localities (Penberth Cove, Land's End, Wolf Rock) are not very far apart, but it would have been better if the subsequent authors had mentioned the true locality. Some French records proved especially difficult to plot on a chart, because they state only that the turtle was captured "au large de . . ." ('off . . .'), but without indicating the distance from the coast. In some instances only the port, to which the turtle was brought, is mentioned and not the locality where it was captured. Therefore, the plotting of the French localities is less accurate than that of localities in other countries. In one instance (De 15) the owners of the German vessel that captured this Leathery Turtle apparently refused

to mention the exact locality, because the position of the herring shoals are kept secret (even after more than a year!). Trespassing in other country's territorial waters was not uncommon in the past, and with the extending of territorial waters by some countries, it will become even more common. It is clear that the trespassers, observing a turtle in another country's waters will not mention the exact locality, and exact records from coastal waters may become more scarce in the future.

In the lists, the records are given in geographical order, according to the countries where the observations were made, starting in the north with Iceland, the sea between Iceland and the Faeroes, Russia, Norway, Great Britain (in the sequence: Scotland, West coast of England, Wales, Southwest England, English South coast and East coast, Channel Islands), Ireland (Northern Ireland, Eire), Denmark, Sweden, Germany, The Netherlands, Belgium, France, Spain, Portugal.

Some specimens have been observed at sea, outside territorial waters, and these have been included in the lists of the country closest to the actual locality.

It is not only of interest to survey the geographical distribution of the records, but it is also interesting to survey them in chronological sequence. Table 2 gives the records according to the years in which the observations were made. Some of the earlier records, for which the year of observation is not known, have been entered under the year in which the report was published; in these instances the number of the record is placed in parentheses. In this table the areas and countries where the specimens were recorded have also been indicated, thus making it possible to see at a glance what records were made in a certain area and country in a certain year. The data of table 2 have been recapitulated in table 3a (according to fifty year periods) and in table 3b for the period 1851-1970 (according to periods of ten years).

There are a number of publications, which contain only a statement about the presence or absence of turtles in European Atlantic waters, or in parts thereof, without mentioning the species by name, and without giving individual records. Thus, Krefft (1962: 357) states that turtles are found in British waters, and in the North Sea, northward to 61°N. M. A. Smith (1949: 6), and R. L. E. Ford (1963: 67) remark that turtles are sometimes found around the coasts of Britain; Mertens (1960a: 48) states that various species of turtles enter the North Sea, but only very infrequently. Other authors indicate that turtles do not occur in the area. Thus, Ackermann (1883: 356) states that there are no turtles in the Baltic, and that they even are absent from the North Sea. When dealing with the fauna of the Ilfra-

combe District, North Devon, Palmer (1946: 44) remarks that "the three vagrant Turtles have not been recorded locally". Most of these general statements add little to the factual knowledge of the occurrence of turtles in the region dealt with in the present paper, and I have not tried to prepare a complete list of them.

However, one general statement is of interest, viz., that by Valmont de Bomare (1765: 473; 1769: 492; 1770: 334; 1771: 49; 1775a: 225; 1775b: 54; 1776: 49; Valmont-Bomare, 1800: 264) in which it is said *inter alia*, that turtles are only rarely taken in the Baltic Sea. This remark implies that Valmont de Bomare knew of at least one record from the Baltic, but as yet I have been unable to trace the source of his information. The only records from the Baltic, which I have found so far, are those of a Loggerhead (Ca 55), which stranded alive at Zoppot in 1835, one of a Leathery Turtle (De 72) captured off Stralsund in 1965, and of a live juvenile Loggerhead (Ca 54 bis) recently stranded alive on the island of Møen, Denmark.

Some publications contain a general statement about a species, which is mentioned by name, having been found in European Atlantic waters, without giving specified records. References to such papers are given at the beginning of the lists of records for the various species. A number of authors (e.g., of faunal surveys, or of check lists) indicate the presence of one or more species, which are mentioned by name, on the coast of one or more countries. References to such publications are included in the lists of records for the various species, preceding the individual records for the country mentioned. Finally, there are the publications that mention individual cases and the references to these have, of course, been cited under the individual records. When an author makes a general statement about the occurrence of a certain species, and adds one record by way of illustration, the reference is only cited under this record. This on the principle, that specified information is of more value than general statements.

Besides indicating for each record the earliest published report, which I could trace, I have added references to later publications, whenever possible. Where several editions of a book have been issued, I have cited as many as I could lay hands on, not because I believe that a record becomes more trustworthy by having been mentioned many times, but because I know how annoying it is to find only a reference to just the edition one has not at hand. When a record is mentioned on the same page in the various editions, the years of publication have been given, followed by the number of the page; e.g., Mertens 1952, 1960b, 1964, 1968a: 28 means that the record will be found on p. 28 of each of the four editions published in 1952, 1960, 1964, and 1968. The lists of references are certainly not complete, for not all editions

and translations were available to me; some records, like De 110, were so well known, that they have been cited by many authors of popular books, and in such cases I have not tried to aim at completeness.

The page numbers cited for the references are those where the record is mentioned, and this is not necessarily the page upon which the cited authors mentioned the name of the species.

Some of the collections from which specimens were examined have been indicated by the following abbreviations:

- AMNH, American Museum of Natural History, New York;
- BM, British Museum (Natural History), London;
- IRSN, Institut Royal des Sciences Naturelles, Brussels;
- LACM, Los Angeles County Museum, Los Angeles, California;
- MCZ, Museum of Comparative Zoology, Cambridge (Mass.);
- MMF, Museum at Funchal, Madeira;
- NMI, National Museum of Ireland, Dublin;
- NMW, National Museum of Wales, Cardiff;
- RMNH, Rijksmuseum van Natuurlijke Historie, Leiden;
- RSM, Royal Scottish Museum, Edinburgh;
- SMF, Naturmuseum Senckenberg, Frankfurt am Main;
- UKMNH, Museum of Natural History, University of Kansas, Lawrence, Kansas.

I. ***Dermochelys coriacea* (L.)**, Leathery Turtle

In English this turtle is also known as Luth, Leatherback (America), Trunk Turtle, or Trunkback; in older British literature it is known as: Spinous Tortoise, Coriaceous Tortoise (Turtle), Leathern Turtle, Great Mediterranean Turtle (Tortoise), etc.

Danish: Laederskilpadde; Dutch: Lederschildpad, Leerschildpad; French: Tortue luth; German: Lederschildkröte; Norwegian: Laerskilpadde; Spanish: Tortuga laúd, Tortuga de Cuero (in Central America: Tinglado); Swedish: Havlädersköldpadde, Lädersköldpadde.

The occurrence in European Atlantic waters is mentioned, inter alia, by:

- Salacroux (1840: 323): le Luth;
- Schlegel (1872, *Kruipende Dieren*: 13): *Chelonia coriacea*;
- Burgersdijk (1873: 17), Schreiber (1875: 509): *Sphargis coriacea*;
- Schmidtlein (1893: 158), M[at]sch[ie] (1897b: 356), Schreiber (1912: 765), Maluquer (1919: 129), Mertens & Wermuth (1960: 72), Villiers (1962: 50), Dottrens (1963: 247), Hvass (1965: 92), Hvass & Arnould (n.d.: 92): *Dermochelys coriacea*;
- Schmiedeknecht (1906: 259): *Sphargis mercurialis*;
- Gruvel (1926: 45), Mertens & Müller (1928: 23; 1940: 21): *Dermochelys coriacea coriacea*.

Its occasional presence in the North Sea is mentioned, inter alia, by:

Kollar, Fitzinger & Heckel (1853: 67): *Dermatochelys coriacea*;

Van der Hoeven (1855: 548; 1852-1856: 330; 1858: 321; 1859: 548): *Chelonia coriacea* (in subgenus *Dermatochelys*);

Schlegel (1866, 1870: v, *Chelonia coriacea*) mentions the possibility of the species straying into the North Sea;

Glüsing (1967: 63, *Dermochelys coriacea*) refers to its occasional presence in the North Sea and in the Baltic Sea.

Some French authors (e.g., Acloque, 1900: 479; Portevin, 1942: 20) mention the accidental presence of turtles in French waters, but as they do not state whether they mean Atlantic and/or Mediterranean waters, such references have been left out of consideration.

I A. List of records of *Dermochelys coriacea* (L.)

ICELAND

De 1, 1.x.1963, dead, mouth of Steingrimsfjörður (on the western side of Húnaflói), Northern Iceland. Museum Reykjavik.

Dr. F. W. Braestrup (in litt. 9.xii.1965).

Brongersma (1968a: 28, 1968f: 217), Pritchard (1971: 32): *Dermochelys coriacea*.

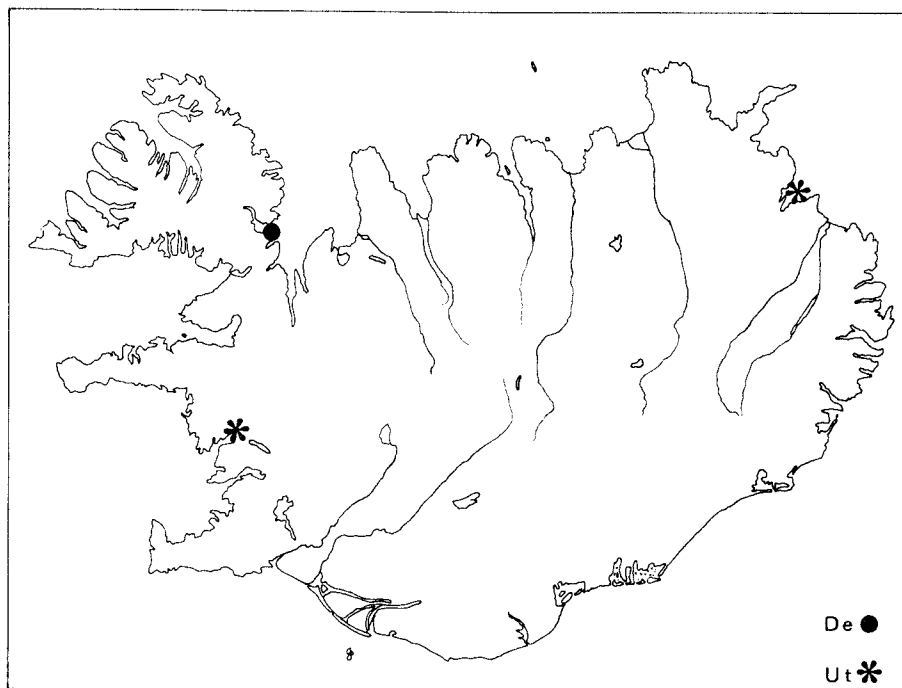


Fig. 24. Map of Iceland to show localities of De 1, Ut 1, and Ut 2.

The turtle was found dead, floating on the surface of the sea, by Einar Hansen of Hólmavík. The Reykjavik Museum sent it frozen to the Zoological Museum at Copenhagen, where a cast was made of it, and where the skeleton was cleaned. The cast and skeleton were to be sent back to Reykjavik.

Judging by the length of the tail the specimen must have been a male.

Weight about 300 kg.

For Iceland see also Ut 1 and Ut 2.

NORWAY

The occasional occurrence in Norwegian waters is mentioned, inter alia, by:

Mertens (1960a: 48; 1960b, 1964, 1968a: 28), Brongersma (1966: 52; 1967a: 2, 11; 1968d: 44), Bleakney (1967: 84), Pritchard (1971: 32): *Dermochelys coriacea*; Stephen (1961: 45), Bleakney (1965: 123): *Dermochelys coriacea coriacea*.

De 2, 1.ix.1958, alive, 30 miles WNW of Andenes (69°18'N, 16°10'E). Vesterålen. Zoologisk Museum, Oslo.

Holgersen (1960a: 135, chart), Brongersma (1966: 53; 1967b: 395; 1967c: 7; 1968f: 225), Pritchard (1971: 32): *Dermochelys coriacea*.

Total length 194 cm; median length of carapace, in straight line 151 cm, along curve 161 cm; length of carapace, measured along the first latero-medial ridge, in straight line 154 cm, along the curve 164.5 cm; width of carapace, in straight line 92 cm, along the curve 111 cm; weight ca. 390 kg. (Dr. E. K. Barth, in litt., 25.iii.1966).

De 3, ca. 12.ix.1957, alive, observed from 8 miles WSW of Hovden (ca. 68°46'N, 14°12'E) to about ¼ mile W of Gaukvaerøy (ca. 68°37'N, 14°17'E).

Willgohs (1958: 508-509), Holgersen (1960a: 135, chart): *Dermochelys coriacea*.

Attempts to capture the specimen failed.

De 4, 31.vii.1956, alive, 17 miles W of Bulandet, Sogn og Fjordane (61°18'N, 4°E).

Willgohs (1957: 163), Holgersen (1960a: 135, chart): *Dermochelys coriacea*.

The turtle was sighted, but not captured. The length was estimated to be 200 cm; the weight was estimated to be 450 kg.

De 5, ♂, 20.viii.1965, alive, about 8 miles W of Skarvøy, Hordaland (60°30'N, 4°40'E). BM 1966. 27.

Brongersma (1969: 81, 86, 90, 92, 94, 96, fig. 3): *Dermochelys coriacea*.

Length of carapace 5 ft. 4 in. (162.5 cm), length from tip of beak to posterior tip of carapace 6 ft. 2 in. (188 cm), width of carapace 3 ft. 1 in. (94 cm); weight 400 kg.

The stomach contained remains of medusae (*Cyanea capillata* Eschscholtz), Amphipods (*Hyperia medusarum* (Müller)), and fragments of marine plants (probably *Halidrys*). Nematodes and Trematodes were taken from the intestine. The oesophagus (from the posterior extremity of the hyoid to the entrance into the stomach) measured 5 ft.

For the information about this specimen I am indebted to Miss A. G. C. Grandison, British Museum (Natural History), London.

De 6, ♂, 28.viii.1956, alive, 30 miles W of Skarvøy, Hordaland (60°31'N, 3°50'E). Zoological Museum, Bergen.

Willgoos (1956: 532, fig. 1; 1957: 163), Holgersen (1960a: 134, chart), Brongersma (1969: 86): *Dermochelys coriacea*.

Total length 215 cm; length of carapace 153 cm, width 86.5 cm; weight about 390 kg; width across the spread fore flippers 250 cm.

Three or four Pilot Fishes (*Naucrates ductor*) accompanied the turtle.

A few barnacles were present on the upper and lower part of the shell; one of these was identified as being *Conchoderma* sp.

De 7, ♀, 7.ix.1956, alive, 10 miles WNW of Lønøy, Hordaland (60°24'N, 4°35'E). Zoological Museum, Bergen.

Willgoos (1956: 534, figs. 2-4; 1957: 163), Holgersen (1960a: 134, chart). Brongersma (1969: 86, 90): *Dermochelys coriacea*.

Total length 185 cm; length of carapace 144.5 cm, width 94 cm; weight 396 kg. The largest ovarian eggs measured 7 mm in diameter.

The turtle was accompanied by Pilot Fishes (*Naucrates ductor*).

Some Amphipods (*Hyperia* spec.) were found among the contents of the intestine.

De 8, ♂, 12.x.1959, alive, W of Karmøy, between Ferkingstadøyene and Svortingen, i.e., SW of Åkrehamn (59°15'N, 5°19'E). Stavanger Museum.

Holgersen (1960a: 131, chart, figs.; 1960b: 153): *Dermochelys coriacea*.

Total length 210 cm; width of plastron 85 cm; weight estimated to have been 400 kg.

The specimen had become entangled in the lines attached to crab-pots.

De 9, 2.viii.1967, alive, 100 metres S of Jeløy (off Moss), Oslo Fjord.

"Moss Avis", 3.viii.1967; "Aftenposten", 4.viii.1967.

Mr. Oddbjørn Pettersen (in litt., 20.ix.1967).

Brongersma (1968f: 225): *Dermochelys coriacea*.

A request for further information published by "Moss Avis" resulted in a letter from Mr. Pettersen, one of the people who saw the turtle.

The keels on the carapace were distinctly seen. When Mr. Pettersen's boat came within eight or ten metres of the turtle, this dived several times. Twice or thrice it raised its head above the surface of the water. After about an hour the turtle disappeared.

The diameter of the carapace was estimated to have been about one metre.

De 10, ix.1967, Norwegian Sea.

Dr. Holger Holgersen (in litt., 18.ix.1967) writes: "From a newspaper I learned only last week that a *Dermochelys* had been harpooned somewhere in the Norwegian Sea recently, no exact locality given. I do not know who caught it or where it was landed, if it was landed."

My attempts to obtain some further information about this specimen through fisheries journals failed.

GREAT BRITAIN AND IRELAND

The species has been mentioned to occur in British and/or Irish waters, inter alia, by:

- Stewart (1801: 272; 1817: 281): *Testudo coriacea*;
 Anonymus (1838c: 222; 1845: 47), Bath (1892: 2), Clermont (1859: 169), Wood (1863: 19), Figuiet (1869: 178, 179; 1892: 163), Duncan (1883: 260), G[ünther] (1886: 467; 1888: 457): *Sphargis coriacea*.
 Van der Hoeven (1855: 548; 1852-1856: 330; 1858: 321; 1859: 548): *Chelonia coriacea* (in subgenus *Dermatochelys*);
 E. Smith (1898-1899: 22), E. G. Boulenger (1914: 14), Babcock (1919: 335), Angel (1923: 483), Deraniyagala (1930: 53; 1939c: 102), Flower (1933: 752), H. W. Parker (1935: 37), Brongersma (1937: 651; 1938: 213; 1943: 244; 1953: 469; 1967a: 11; 1967b: 395; 1967c: 7; 1968a: 29; 1968d: 44), Loveridge (1945a: 14; 1945b: 16), Fraser & H. W. Parker (1949, 1953: 37), Matthews (1952: 48), Mertens (1952, 1960b, 1964, 1968: 28), Noël-Hume (1954: 104), Popovici & Angelescu (1954: 552), Villiers (1958: 196), Anonymus (1960: 231), Hvass (1965: 92), Hvass & Arnould (n.d.: 92), Garms (1968: 151), Thomas (1968: 89): *Dermochelys coriacea*;
 E. G. Boulenger (1937: 141): *Dermochelys coriacea*;
 Carr (1952: 443), Hellmich (1956: 88), Leutscher (1966: 78): *Dermochelys coriacea*;
 E. Hardy (1947), Burton (1960: 972): Leathery Turtle;
 A. H. Clark (1948: 423): leather-back;
 Bullen (n.d., 1st part: 115): *Spharga coriacea*.

GREAT BRITAIN

SCOTLAND

Sears (1887: 88, *Dermatochelys coriacea*) mentions the Leathery Turtle as having been found in Scotland, but I have not been able to trace any definite record from before 1951. However, it seems likely to me that some

records of Great Sea Serpents recorded from Scottish waters, and which are referred by Heuvelmans (1965, 1968) to the species of Sea Serpents which he named *Plurigibbosus novae-angliae*, in fact are based upon Leathery Turtles (cf. Brongersma, 1968*f, g*).

The occurrence in Scottish waters is also mentioned by Bleakney (1965: 123, *Dermochelys coriacea coriacea*).

De 11, 5.ix.1956, alive, 40 miles NE of Flugga (Shetland).

Willgoos (1956: 535; 1957: 163), Holgersen (1960*a*: 134, chart): *Dermochelys coriacea*.

Stephen (1961: 45): *Dermochelys coriacea coriacea*.

The turtle was harpooned by Norwegian fishermen, but later it was thrown back into the sea. The weight was estimated to have been over 350 kg.

De 12, 30.viii.1955, alive, about 4 miles off Noss Head (Shetland).

"Press & Journal", Aberdeen, 31.viii.1955.

Stephen (1961: 44, no. 4), Taylor (1963: chart 8): unidentified.

From the "Press & Journal" it is clear that the turtle was sighted on August 30th and not on September 1st as stated by Stephen. The turtle was seen by Robert Wares and Donald and John Dunnett, of Staxigoe, when fishing off Noss Head in their boat "Twinkling Star". John Dunnett gave the following account: "We saw it on the surface quite near our boat and thought at first it was a floating oil drum. We turned the boat and approached, but it travelled fast for a bit and, as we drew near, dived and disappeared. Its body was about 5 ft. long and 3 ft. broad and its neck was nearly 2 ft. long with a black head like a snake. It was a dark-green colour." ("Press & Journal").

The length of the neck as stated by John Dunnett, probably will have been the length of head and neck. With the size indicated (carapace about 153 cm long, and 91.5 cm wide) the turtle must have been a Leathery Turtle.

It is interesting that the colour is described as being dark green. In various recent accounts of observations a greenish colour is mentioned for the Leathery Turtle.

De 13, 28.viii.1967, alive, North side of Papa Stour (Shetland).

"The Shetland Times", 8.ix.1967: 5.

Anonymus (1967*d*: 28): large turtle.

R[ae] (1968: 25): *Dermochelys coriacea*.

Mr. Peter Moncrieff (in litt., 16.x.1967).

The turtle had become entangled in one of the marker buoy ropes of a string of lobster creels. It was towed ashore, and when the rope slackened

it freed itself. The turtle began to flounder around among the weed covered rocks until it eventually got into deeper water and soon disappeared. "It was about six feet long overall and a greyish green colour. The underside was a dirty white colour with darker patches. The fore flippers were black and not unlike a whales fin. The flippers at the rear were on short very feeble looking legs" (Mr. Moncrieff, in litt.). The turtle had ridges on its back like boat keels.

De 14, 11.x.1959, alive, 20 miles NNW of Cape Wrath (Sutherland).

R[ae] (1959: 22): Leathery Turtle.

"Press & Journal", Aberdeen, 21.v.1960.

Stephen (1961: 45-46): *Dermochelys coriacea coriacea*.

Taylor (1963: chart 8), Brongersma (1968d: 44): *Dermochelys coriacea*.

The turtle was observed by skipper J. Herd of the Aberdeen trawler "Strathelliot"; it was about 5 ft. (153 cm) long, and about 4 ft. (122 cm) broad. "The head was grey and white, while the body was rather darker". Of the ridges on the carapace, three were observed "one down the centre of the carapace, and one on either side". "While the turtle was under observation it was being attacked by gulls, which were evidently trying to pick out its eyes" (Stephen, 1961: 46).

De 15, 11/12.ix.1966, alive, near the Hebrides. SMF' 62797, skeleton.

"Nordsee-Zeitung", Bremerhaven, no. 226, 26.ix.1966; no. 230, 3.x.1966, fig.

This turtle was captured somewhere off the Hebrides by the German trawler "Fyllasbank" when fishing for herring in the night of the 11th to 12th of September, 1966. No information about the exact position where the specimen was taken was given to the Institut für Meeresforschung, Bremerhaven, to which the turtle was passed at first, nor to the Senckenberg Museum, which received the skeleton. A letter to the owners asking for this information remained unanswered; it seems that the position of the herring shoals is still a secret after one year.

On arrival at Bremerhaven, six weeks after its capture, the turtle was so much bloated by gases due to decomposition that no measurements but those of the carapace could be taken.

Carapace, long 149 cm, wide 84 cm (Mr. G. Behrmann, in litt., 16.viii.1967). According to the press reports the turtle was more than 2 m long; the weight was estimated to have been 300 kg.

The first press report (26.ix.1966) gives a figure of a Leathery Turtle at a nesting site; the second (3.x.1966) gives a figure of the present specimen.

De 16, first half of viii.1962, dead, west shore of Baleshare Island (off North Uist), Outer Hebrides (Inverness).

"Scotsman", 6.vi.1962: "A dead turtle weighing nearly one ton has been washed ashore on Baleshare Island, off North Uist. It was entangled with ropes and wires."

Anonymus (1962b: 26-27, Leathery Turtle): "Some time later a large turtle was found stranded on the west shore of Baleshare Island, North Uist, by a visitor from Lanarkshire. Although dead and beginning to desintegrate, the animal appeared to have drifted ashore sometime in the first half of August. From its length about 6 feet [183 cm], and the description of the 'shell' as 'leathery', it would appear to have been a leathery turtle... The finder added the interesting information that a rope was attached to the left fore flipper. This rather suggests that the two reports [De 16, De 17] refer to the same animal."

Of course, it is possible that records De 16 and De 17 were based upon one and the same turtle, but there is no proof of this. We know that more than one Leathery Turtle may be present in the same general area, and we also know that these turtles may become entangled in the lines attached to lobster pots. In cases like this it is to be regretted that the crew which attached a buoy to De 17 did not state how they attached it, and that the one report on De 16 does not mention what kind of rope was attached to the fore flipper, and that the other report states that it was entangled "with ropes and wires."

De 17, 10 or 11th? vii.1962, alive, Curachan Ground, Southern Minch (E of Barra Isle), Outer Hebrides (Inverness).

"Press & Journal", 13.vii.1962.

Anonymus (1962b: 26): Leathery Turtle.

On the night of Tuesday, July 10th, 1962, skipper Donald Reid and the crew of the ring-netter "Castle Moil", of Skye, captured this turtle in their nets. The crew succeeded in hitching a nylon rope around it. They tried hoisting it inboard with a power winch, but the one-ton-breaking-point rope snapped. Determined that they should not lose the turtle entirely, the fishermen managed to attach a fishing buoy to it. Meantime another Skye boat, the "Sweet Home" (skipper Billy Finlayson) arrived on the scene, but the turtle defied the efforts of both crews to land it. A search for the turtle was made during the night of July 11th and the morning of July 12th, but it could not be found. A member of the crew of the "Sweet Home" estimated the length of the turtle at 12 ft. by 6 ft. (Press & Journal). The estimate of the size appears to be exaggerated.

See also: De 16.

De 18, 13.ix.1959, alive, Soay, North Ebudes (Inverness).

"Press & Journal", 20.v.1960; 21.v.1960.

J. H. Fraser (in: Press & Journal, 21.v.1960): Leathery Turtle.

Burton (1960: 972, figs.; 1961a), Bridgewater (1967: 208): Soay Beast.

Maxwell (1960: 64).

Heuvelmans (1965: 567, fig. 111A-B): la Bête de Soay, le Serpent-de-mer de Soay.

Heuvelmans (1968: 497, 565): Soay Beast.

Holiday (1966a, 1966b).

Brongersma (1967c: 7; 1968a: 30; 1968d: 34; 1968f: 222; 1968g: 72): *Dermochelys coriacea*.

The identity of the animal observed by Mr. Tex Geddes and Mr. James Gavin off Soay on September 13th, 1959, has been discussed by me at some length (Brongersma, 1968d). To the argumentation given there, the following may be added. Mr. Geddes had the impression that the body was scaly, but Mr. Gavin was not certain about scales being present (Burton, 1960: 972). The impression of a scaly skin may have caused by the presence of numerous, irregular, whitish flecks on the body. In some specimens of the Leathery Turtle these flecks are more numerous and more generally spread over the whole of the body, and at some distance the observer may obtain the impression that the body is covered with scales.

De 19, 23 or 25.x.1968, alive, Loch Beag, Craginish Peninsula (Argyll).

Dr. A. S. Clarke (in a letter to Dr. F. C. Fraser, and in litt., 12.xi.1968); Miss A. G. C. Grandison (in litt., 29.x.1968).

Pirie (1969: 31): *Dermochelys coriacea*.

The date October 23rd and the locality Loch Beag were mentioned by Dr. A. S. Clarke in his letter to Dr. F. C. Fraser. Pirie gives the locality as having been Loch Craginish, and the date as October 25th.

The turtle was described as being black and leathery with three (possibly more) ridges down the back. The length was said to have been about four feet from head to tail. In his letter of November 12th, 1968, Dr. Clarke writes that the turtle "seems to have been pushed out to sea again almost as seen as stranded."

With a total length of about four feet, the specimen seems to be about the smallest to have been recorded from European Atlantic waters. Moreover, it seems to be the first record of a Leathery Turtle having been stranded alive in this area. In Japan the Leathery Turtle is known to be stranded alive (cf. Nishimura, 1964: 187), but these strandings take place in the coldest time of the year (in the second half of February), and the turtles are "considerably exhausted". There is no indication that the Loch Beag turtle was exhausted or benumbed in any way. According to Pirie (1969: 31) the turtle was returned to the water after it had been identified, "and immediately swam off".

De 20, ♂, 11.viii.1959, alive, Kilbrannan Sound, between Kintyre (Argyll) and Arran (Bute).

"The Times", 12.viii.1959: 5 cwt Turtle.

"The Times", 13.viii.1959, Taylor (1963: chart 8), Brongersma (1968d: 44; 1969: 77): *Dermochelys coriacea*.

R[ae] (1959: 22): Leathery Turtle.

"Press & Journal", 21.v.1960.

Stephen (1961: 46, fig.): *Dermochelys coriacea coriacea*.

The turtle was captured by the crew of the ring-net boat "Hercules", it was taken to Calderpark Zoo, Glasgow, where it died. The carcass was transferred to the Kelvingrove Museum, Glasgow, where it was dissected.

Total length 73½ in. (about 187 cm); length of carapace 54½ in. (138.5 cm); width of carapace taken along curve 37¼ in. (94.6 cm), between perpendiculars 28 in. (71.1 cm); weight 532 lb. (about 241 kg) (Stephen, 1961: 46).

Apparently the animal died from a fractured skull, which might have been caused by a blow from a ship's propeller (Mr. S. H. Benson, according to "The Times", 13.viii.1959).

A few sessile barnacles were present (Stephen, 1961: 46).

De 21, 30.viii.1961, alive, between Ayr (Ayrshire) and Pladda (Bute), Firth of Clyde.

Anonymus (1961: 17): Leathery Turtle.

Stephen, Rae & Lamont (1963: 37): *Dermochelys coriacea coriacea*.

The turtle was swimming at the surface. The measurements were estimated to be: (total) length 6 ft. (183 cm); width 3 ft. (91.5 cm).

De 22, 28.viii.1961, alive, between the Mull of Galloway and Port Patrick (Wigtown).

Anonymus (1961: 17): Leathery Turtle.

Stephen, Rae & Lamont (1963: 37): *Dermochelys coriacea coriacea*.

In both papers it is suggested that the records here listed as De 21 and D 22 may refer to the same animal. Although this is well possible, it is by no means certain, and hence I have entered them as separate records.

De 23, 26 (or 25?) .viii.1959, dead, on the shore of Solway Firth, near Annan (Dumfries). RSM 1959.49.1 (head and flipper).

R[ae] (1959: 22): Leathery Turtle.

Stephen, Rae & Lamont (1963: 37): *Dermochelys coriacea coriacea*.

Taylor (1963: chart 8), Brongersma (1968d: 44): *Dermochelys coriacea*.

The turtle was said to be 6 ft. (183 cm) long, and 3½ ft. (106.5 cm) broad.

De 24, 16.ix.1961, alive, 4 miles SE of Wick (Caithness).

Anonymus (1961: 17): Leathery Turtle.

Stephen, Rae & Lamont (1963: 37): *Dermochelys coriacea coriacea*.

"The rough description of the animal which was about 5 ft. [153 cm] long, again suggests a leathery turtle" (Anonymus, 1961: 17).

De 25, vii.1966, alive, 90 miles NE of Kinnaird Head (Aberdeenshire).

R[ae] (1968: 26): *Dermochelys coriacea*.

Mr. John Buchan, skipper of the "Graceful", of St. Combs (in litt., 13.iv.1967) reported sighting this turtle. The body (i.e., the carapace as far as this was visible) was estimated to be about 4 feet (122 cm) long. Asked whether the head and neck were raised above the water, Mr. Buchan writes (v. 1967): "We saw the head and neck clearly while it was swimming." The ridges on the back were not observed. Still, a turtle of this size can have been nothing else but a Leathery Turtle. It was swimming at the surface in a southerly direction.

De 26, iv-v.1957, dead, beach 2 miles N of Arbroath (Angus).

Reported by Mr. Shepherd in his letter of 20.viii.1957. The carcase was headless and limbless, and it lay on the beach for about three weeks. Carapace 5-6 ft (153-183 cm) long, with five ridges. Mr. Shepherd supposes that this carcase was the same as that here recorded under De 27. Mr. J. C. Battersby (British Museum (Natural History)), in his correspondence with Mr. Shepherd, assumed that this carcase was the same as the one here recorded under De 28.

De 27, 1957, dead, Moniefieth sands (Angus).

According to Mr. R. W. Shepherd (in litt., 20.viii.1957) it seems highly likely that the carcase, seen and photographed on Moniefieth sands by a friend of his, is the same as the one found near Arbroath (De 26). When on Moniefieth sands the carcase still had fore flippers.

De 28, 27.ii.1957, dead Wee Bankie, 24 miles SSE of Arbroath (Angus).

Rae (1957: 14), Taylor (1963: chart 8): *Dermochelys coriacea*.

Stephen (1961: 44-55): *Dermochelys coriacea coriacea*.

The carcase became entangled in the net of the seiner "Eight Belles"; it was in a very bad state, and with difficulty it was cleared of the nets; no part was kept. Mr. F. D. J. Buist, owner of the "Eight Belles" wrote about this turtle to the Keeper of the Natural History Department of the Royal Scottish Museum (17.iii.1957): "The creature was in an advanced state of decomposition, although the head, flippers and tail could still be identified

and there were traces of blood at the neck." It was not measured, but from recollection, Mr. Henry Y. Smith, skipper of the "Eight Belles" estimated the length to have been 4½-5 ft. (137-152 cm), and the greatest width at 3 ft. (91.5 cm). The shell was smooth, except for three longitudinal ridges.

If the opinions expressed by Mr. J. C. Battersby and Mr. R. W. Shepherd about the identity of the carcasses here recorded under De 26, De 27, and De 28, are accepted, these three records would be based upon but a single specimen in different stages of decomposition.

De 29, ♀, 27.xi. 1967, alive, approximately 2½ miles ESE of Crail Harbour (Fife). RSM.

"The Scotsman", 28.xi.1967, fig. 1; "Glasgow Herald", 28.xi.1967; "Daily Telegraph", 28.xi.1967.

R[ae] (1968: 25 pl. iv), Brongersma (1969: 86, 90, 92, 96): *Dermochelys coriacea*. Miss A. G. C. Grandison (in litt., 28.xi.1967), Dr. A. S. Clarke (in litt., 12.xii.1967).

The turtle had become entangled in a rope of a lobster creel. It was towed ashore alive, but died soon afterwards. The carcass was sent to the Royal Scottish Museum.

Dr. A. S. Clarke sent me the following measurements.

Total length between perpendiculars	193	cm
Width across spread fore flippers	230	cm
Carapace, long, over curve	164	cm
" between perpendiculars	154	cm
" wide, over curve	119.5	cm
" between perpendiculars	91.5	cm
Greatest depth	48	cm
Tail (measurement not considered reliable)	18.5	cm
Length of gut	1255	cm
Oesophagus, separately	190.5	cm
The weight was calculated from that of the various parts and organs:		
Plastron	76	lb
Carapace	209	lb
Kidneys and Liver	52	lb
Left hind flipper	42	lb
Right hind flipper	38	lb
Left fore flipper	77	lb
Right fore flipper	70	lb
Gut	65	lb
Head	41	lb
Miscellaneous skin and flesh	50	lb
Heart (4 lb. 6 ozs.) + contained blood	8	lb
Ovaries, uteri, etc.	8	lb
Blood (including estimated loss)	56	lb
		<hr/>
		772 lb,

i.e., about 350 kg.

In the last four feet (122 cm) of the oesophagus six jellyfish were found; these were identified by Dr. W. Vervoort (Leiden) as being *Cyanea capillata* Eschscholtz (Brongersma, 1969: 92).

The carapace at first gave the impression of being uniformly dark in colour, but when looked at closely and in good light it was seen to be more, or less uniformly mottled by slightly lighter, coloured patches about one inch or so in diameter with a fairly even distribution of light and dark areas (Dr. A. S. Clarke, in litt.).

A few barnacles were collected from the junction of limbs and body. There were also scars, which may indicate the positions where barnacles had been attached (cf. Zullo & Bleakney, 1966: 162, fig. 1A, B).

De 30, ♀, 15.x.1951, alive, Devil's Hole, North Sea, 56°10'N, 0°W. Naturhistorisk Museum, Aarhus.

Willgoos (1956: 542), Holgersen (1960a: 134, chart): *Dermochelys coriacea*.
Thamdrup (1966: 20, fig.): Leaderskildpadde.

The turtle was captured by skipper Knud Thomsen, and it was presented to the Aarhus Museum by the firm of Søren Løth & Sønner. Twenty-two thousand people came to see it.

Length 178 cm; weight 313 kg.

ENGLAND

De 31, ca. 14.ix.1960, alive, off Whitehaven (Cumberland).

"The Times", 15.ix.1960: leather-backed turtle.
Taylor (1963: chart 8): *Dermochelys coriacea*.

"The Times" wrote: "A giant leather-backed turtle weighing nearly 5 cwt, was released yesterday in the Irish Sea after being landed at Whitehaven from the motor fishing vessel Silver Scout. It was hauled aboard in the trawl from a depth of 22 fathoms."

De 32, 26.ix.1948, alive, 8 miles NW of Hilbre Island (Cheshire). (Fig. 25).

Ellison (1948: 15, fig.), E[llison] (1949: 7, fig.), Ellison (1950a: 15; 1950b: 161-164, 2 figs.; 1953: 601; 1959: 28), Brongersma (1968d: 39, 42, fig. 2B; 1968f: 223).

The turtle was sighted by W. H. Jones, skipper of the fishing boat "Ivy", who made the following statement: "This object was oval in shape, about 4 ft. 6 ins. by 3 ft. 6 ins. visible above the water. Running down the centre of the back was a raised fin, about 2 ins. high, notched in ridges, for the full length visible. On either side of it, and about 15 ins. distant, were parallel fins, raised but not notched. They reminded me of bilge keels. The colour



Fig. 25. *Dermochelys coriacea* (L.); sketch by skipper W. H. Jones of the Leathery Turtle observed by him off Hilbre Island (De 32); by permission of Cheshire Life.

was brownish-black. We then saw a long slender neck slightly tapering to the head, rise out of the water straight up to a height of about 2 ft. The diameter of the neck at the bottom would be about 10 ins. and it tapered off until it met the head to a diameter of about 8 ins."

The turtle swam at a speed of approximately 2 to 3 miles per hour.

Fig. 25 gives Skipper Jones's impression of this turtle.

For further records from ENGLAND see De 45-De 61.

WALES

De 32 bis, 25.viii.1971, alive, 4-5 miles NE of the Great Ormes Head (Carnaervonshire).

Mr. M. J. Woodland (in litt., 31.viii.1971, addressed to Mr. R. W. Blacklar, Fisheries Laboratory, Lowestoft).

The turtle was sighted by the skipper and crew of the 'Scots Lass', a trawler from Conway. They sighted "an object which looked suspiciously like the underside of an upturned dinghy. On drawing closer they revised their opinions first to a seal or dolphin and finally when it was only a short distance away to a turtle, identifying the flippers and armour-plated shell, which apparently unlike they expected, appeared to have a series of ridges culminating in a central ridge running down its back. The shell was dark grey to black with mottlings of a lighter colour and the crew estimated the overall length to be at least 6 feet. There was no mistake in identification, as it was passing within a boat hook's length when suddenly it sank abreast of the vessel."

The presence of a series of ridges, the description of the colour, and the estimated size make it clear that a Leathery Turtle was sighted.

De 33, 18.xi.1960, dead, stranded on Cymyran shore, W coast of Anglesey.

Burdon-Jones (1961: 38-42, 2 figs.): *Dermochelys coriacea coriacea*.

Taylor (1963: chart 8): *Dermochelys coriacea*.

Burdon-Jones (l.c.): "Although the head and flippers were missing and the torso was in an advanced stage of decay, it was possible to identify it as the Atlantic Leatherback Turtle, *Dermochelys coriacea coriacea* (Linn.). It had evidently been dead for several weeks."

Length of the shell 3 ft. 9 in. (ca. 114 cm).

Some of the platelets from the carapace have been preserved in the Zoological Museum, University College of North Wales, Bangor.

De 34, 1961, dead, washed ashore on the W coast of Anglesey.

Mr. P. M. A. Plews (in litt., 8.xi and 1.xii.1967).

Length about 3 feet (about 91.5 cm).

De 35, late summer of 1948, alive, W coast of Anglesey.

Mr. P. M. A. Plews (in litt., 8.xi and 1.xii.1967).

The turtle was sighted by Mr. Plews in fairly shallow water (about 5 ft. deep), it "seemed to be in the best of health and swam off at a fair pace."

De 36, 18.vi.1908, Pwllheli Harbour (Caernarvon); BM 1909.7.10.1, ad., skeleton, purchased of Gerrard.

Patterson (1914: 1): *Dermatochelys coriacea*.

Taylor (1948: 10, 26; 1963: chart 8), E[llison] (1949: 9), Ellison (1950a: 15; 1950b: 161), M. A. Smith (1951, 1954, 1964, 1969: fig. 84), Brongersma (1967b: 395): *Dermochelys coriacea*.

Burdon-Jones (1961: fig. 2): *Dermochelys coriacea coriacea*.

I am greatly indebted to the Superintendent and Deputy Chief Constable, Gwynedd Constabulary, Caernarvon, for supplying me with some information about this turtle (in litt., 1.i.1966).

Mr. B. V. Howell, Secretary of the Royal National Lifeboat Institution, Pwllheli, who was an eye witness to the capture wrote as follows (in litt., 11.i.1966): "The turtle was first seen in the inner harbour in the morning of June 18th and as the tide receded men in two rowing boats managed to secure it to a mooring buoy close to the railway station but not till they had inflicted a considerable damage to the poor animal."

Miss Sara Roberts, J. P., Pwllheli, who, when a small child saw the turtle, sent to me on loan two picture postcards, which were issued at the time. The one is a photograph showing the turtle in the water: "Huge Turtle caught in Pwllheli Harbour (7½ feet long)." The other is a coloured picture postcard showing the turtle on land: "Leathery Turtle. Caught in Pwllheli Harbour, June 18th, 1908; weighing over half a ton. Length 7 ft. 6 in. [228.5 cm], breadth from fin to fin 7 ft. 4 in. [223.5 cm]."

The skeleton was prepared by Gerrard, who sold it to the British Museum (Natural History).

Ellison (1950b) mentions "a photograph printed in a contemporary publication of a "monster" captured in Pwllheli harbour 18th June 1908." I have not been able to trace this contemporary publication.

De 37a-37d, viii.1960 (a), and 11.ix.1960 (b), and 18.ix.1960 (c), and 24.ix.1960 (d), alive, St. Bride's Bay (Pembrokeshire).

Burdon-Jones (1961: fig. 2): *Dermochelys coriacea coriacea*.

Taylor (1963: chart 8), Crothers (1966: 139), Brongersma (1968d: 39, 42): *Dermochelys coriacea*.

Mr. J. H. Barrett (in litt., 21.ix.1960), Mr. J. S. DeVall (in litt., 5.xi and 11.xi.1967), Mr. I. J. Chapman (in litt., 26.xi.1967).

Mr. I. J. Chapman writes: "I did see a turtle in Aug. 1960. It was very near the shore; head well above water. I tried to put a rope on the neck. It went underneath the boat & we could feel it rubbing. It was about 6' to 8' long & very rough back. After about a quarter of an hour it swam away very fast & disappeared. I did not see it again, but I heard it was in the Bay for about a month". Mr. Chapman reported having seen the turtle off Newgale.

JHB (in: Crothers, 1966: 139) gave the following information: "One, about 5 feet long, at first mistaken for an upturned dinghy with barnacles on it, seen off Little Haven by Mr. T. McClements, 11.9.60: it remained in the area for some time, being seen again on the 18th and 24th."

The reports assume that it was one and the same turtle that was observed in different parts of the bay and on different days, and I have included it here as such. Mr. John H. Barret (in litt., 21.ix. 1960), when reporting the sighting of a Leathery Turtle in St. Bride's Bay to the British Museum (Natural History), added: "three weeks ago another turtle was washed ashore dead: Druidstone Haven, so battered that identification was impossible." Although there is no evidence that this was the carcase of a Leathery Turtle, it at least proves that another turtle was present in the area sometime in August. Taking this in connection with observations made elsewhere about more than one Leathery Turtle coming to the same general area at the same time, the possibility cannot be excluded that the observation in August was based upon another specimen than that sighted alive in September.

De 38-De 43, Carmarthen Bay.

The first information about a large turtle having been observed in Carmarthen Bay in 1966 was received from Mr. A. H. Harries, of Saundersfoot, (in litt., 16.i.1967), who added: "there has been a Turtle in this Bay (Car-

marthen Bay) for the last ten years . . . This Turtle appears every summer, and has been seen on most days swimming about the Bay." Mr. W. J. Garner, of Swansea, (in litt., 12.ii.1967) wrote on the same subject: "My own firm opinion is that this chap arrives here every season." Of course, it is not possible to prove that it was always the same specimen that visited Carmarthen Bay for a number of years, but the statement that Leathery Turtles have often been seen there is of great interest in itself. Through correspondence I received confirming information for the years 1960, 1961, 1962, 1964, 1966, and 1967. Perhaps a more intensive search for data, undertaken locally, would produce records for the other years.

Mr. A. W. Tuttle, of Saundersfoot, (in litt., 22.xi.1967) also mentions having sighted turtles in Carmarthen Bay, but he is unable to give the exact dates; he feels that two of his sightings were within a day or so of those by Mr. W. J. Garner (De 38, De 39); he further feels sure of having seen a turtle sometime in September 1964, and this may have been the one reported by Mr. H. Jones (De 41), and one somewhere around the middle of October 1966 (De 42*d*). The first time Mr. Tuttle sighted a turtle in Carmarthen Bay "it was so big that I went charging over with a view picking up an overturned dinghy and may be swimmers. No one was more surprised than me when the "dinghy" raised a head as big as a large bucket and then submerged in about 2 seconds flat."

For 1966 I obtained four sight records, three of which I believe can be safely accepted as being based upon Leathery Turtles; the fourth record (De 42*a*) still leaves some doubt. Although it is possible that these records were based upon different specimens, it is equally well possible that they pertain to a single turtle staying in Carmarthen Bay for about two or three months. Therefore, I have listed them under one number, adding a letter to indicate the individual sightings (De 42*a-d*).

The figure of a Leathery Turtle in the "Herald of Wales" (10.ix.1966, no. 7.504) is not based upon a Carmarthen Bay specimen, but it has been copied after a figure of a Ceylonese specimen published by Deraniyagala (1930: pl. viii; 1939*c*: fig. 12).

Holiday (1966*a, b*) considers the animal seen in Carmarthen Bay to have been a "Worm", i.e., something like the Loch Ness Monster. As already expressed by me in a previous note (Brongersma, 1967*b*) the evidence of the eye-witness accounts points to the creature seen in Carmarthen Bay being a Leathery Turtle.

De 38, 25.x.1960, alive, Carmarthen Bay, off Pendine (Carmarthenshire).

Mr. W. J. Garner (in litt., 12.ii.1967).

De 39, 24.ix.1961, alive, Carmarthen Bay, off Pendine (Carmarthenshire).

Mr. W. J. Garner (in litt., 12.ii.1967).

Mr. W. J. Garner kindly provided me with these two records (De 38, De 39) from his fishing log. The turtle is described as being very large, with an enormous neck and head; the colour was dark, between grey and black. At one time gulls were circling over the turtle, but when they came low the turtle shot out its head at them. For a similar observation about gulls trying to attack a Leathery Turtle I may refer to De 14.

De 40, viii.1962, alive, Carmarthen Bay.

Mr. J. S. DeVall, of Saundersfoot (in litt., 5.xi and 11.xi.1967).

Brongersma (1968d: 39, 42).

Mr. DeVall places the event as almost certainly in the second half of August. He gave the following description: "It appeared black with a fairly shallow ridged shell about five or six feet long by approx. two feet to two feet six inches wide. Whilst looking at this, it slowly and very purposefully raised a rather thick neck some six or seven inches in diameter surmounted by a rather roundish head approximately the size of a football, the neck and head appeared a dark brown leathery texture, and we were able to make out the outline of fairly large flippers, though not very distinctly. This turtle very slowly looked at us, and with the same slow movement lowered its head and neck, the movement of the flippers was barely perceptible and it disappeared below the surface, the total viewing time was not more than thirty seconds. We were a bit taken aback, but it confirmed earlier reports. Some three hours later we had just knocked out to haul the trawl, in almost the same vicinity when either another turtle or the same one surfaced some thirty or forty feet dead ahead, though disappeared almost instantly."

The first observation was made from a distance of less than five feet; Mr. DeVall had approached the object, because at first he took it for an overturned dinghy or small rowing boat.

De 41, 29.ix.1964, alive, Carmarthen Bay, off Morras (Carmarthenshire).

Mr. H. H. Jones (in litt., 2.ii.1967).

Anonymus (1964): Turtle.

Brongersma (1969: 86, 92): *Dermochelys coriacea*.

The turtle was observed by Mr. H. H. Jones and Mr. R. Thomas. Anonymus (1964) quoting Mr. Jones, estimated the length to have been between 6 ft. (183 cm) and 8 ft. (244 cm), the breadth between 3 ft. (91.5 cm) and 4 ft. (122 cm). It had spiny ridges on its back; the colour was described as being black or dark green. The turtle was feeding on a large jellyfish.

De 42a, 18.vii.1966, alive, river Towy, about half a mile on the Llanelli side of Carmarthen Railway Station (Carmarthenshire).

"South Wales Evening Post", 3.ix.1966.

Mr. Trevor Bowen (in litt., 26.iii.1967).

Mr. Trevor Bowen, from a stationary railway engine, saw a strange creature in the river Towy. It had a dark head the size of a football and with large eyes. Mr. Bowen writes: "what it was I really do not know." As some time later a Leathery Turtle (De 42b) was observed in Carmarthen Bay it was suggested that the creature seen by Mr. Bowen may have been also such a turtle. Although no definite identification could be made, the explanation is not unlikely, and for the sake of completeness the record is inserted here.

De 42b, 14?viii.1966, alive, Carmarthen Bay, about 4 miles of Pendine Beach (Carmarthenshire).

"South Wales Evening Post", 1.ix.1966; "Herald of Wales", 10.ix.1966.

Mr. P. Davids (in litt., 8.iii.1967).

Brongersma (1968d: 39): *Dermochelys coriacea*.

The turtle was sighted by Mr. Peter Davids: "It has a head like a tortoise and a jagged ridge across the back" ("South Wales Evening Post"); "black with a tortoise-like head the size of a football and a neck at least two-feet long" ("Herald of Wales").

The length was estimated to have been about 8 feet.

De 42c, 28?viii.1966, alive, Carmarthen Bay, 2 miles off Pembrey (Carmarthenshire).

"South Wales Evening Post", 1.ix.1966, "Herald of Wales", 10.ix.1966.

Mr. P. Davids (in litt., 8.iii.1967).

Brongersma (1968d: 39, 42): *Dermochelys coriacea*.

The turtle was sighted on a Sunday about two weeks after De 42b was seen, which was at about the middle of August, and this makes it likely that it was observed on August 28th. The sea was rough, and more of the turtle was seen this time. It was at the surface "with its neck jutting forward and upward at an angle." Mr. Davids estimated it to be at least 10 to 12 feet long. Taking into account that it was observed from a distance between 150 and 200 yards, it must have been difficult to make an exact estimate of the length and no doubt this was unwittingly exaggerated. The colour is stated to have been a rusty-brown.

The reports on De 42b and 42c differ in the estimated size and in the colour ascribed to the turtle, and this may point to two different specimens having been observed. However, the observations were made under different

weather conditions and from different distances, and this may perhaps explain the difference in the reports. The question whether one or two Leathery Turtles visited Carmarthen Bay in August 1966 must be left unanswered.

De 42d, around middle x.1966, alive, Carmarthen Bay.

Mr. A. W. Tuttle (in litt., 22.xi.1967).

De 43, 15.x.1967, alive, Carmarthen Bay, between buoys DZ7 and DZ5 (Carmarthenshire).

Mr. J. S. DeVall (in litt., 5.xi. and 11.xi.1967).

The turtle was observed by Messrs. R. & J. Phillips, of Angle nr. Pembroke.

De 44, ix.1909, alive, 80 miles W of Cardiff (i.e., in the approaches to the Bristol Channel). NMW.

Patterson (1914: 1): *Dermatochelys coriacea*.

Matheson (1942: 493, fig.), Brongersma (1967b: 395): *Dermochelys coriacea*.

The turtle was captured by the French trawler "Jubarte".

Total length 5 ft. 9 in. (ca. 175 cm); width across the spread fore flippers 6 ft. 4 in. (ca. 193 cm); weight about 350 kg.

ENGLAND (continued)

De 45, 20.viii.1966, alive, 3 miles SE to one mile S of Lundy (Devon).

Mr. C. S. Waller (in litt., 31.viii. and 15.x.1966), Mr. A. T. Vickery (in litt., 7.xi.1966), Mrs. Sheila Glover (in litt., 28.vi and 27.vii.1967), Major John Day (in litt., 3.viii.1967).

Day (1966: 1210, fig.): *Athecae sphargis*.

Holiday (1966b: 1305): turtle.

Brongersma (1967b: 395; 1968d: 42; 1969: 92): *Dermochelys coriacea*.

The turtle was first sighted about three miles SE of Lundy by Mr. & Mrs. Glover, who, from their yacht, kept it under observation for well over an hour. Having informed other yachts of the presence of a turtle they were later joined by other vessels and, thus, the turtle was observed by a number of people. Major John Day took some photographs of the turtle, and one of these was published in "The Field" (Day, 1966, fig.).

Three of the keels of the carapace were visible. Although the photographs are not very clear it seems that the median keel was notched. Estimates of the size differ somewhat. Mr. Vickery estimates the length at about five to six feet; Major Day estimates it to have been between three and four feet. The turtle raised its head quite clear of the water on several occasions. Mr. Glover estimates the length of head and neck to have been between 15 and

18 inches, equalling about one third of the length of the shell; this would make the total length about six feet. The colour is described by Mr. Vickery as being a light greenish-brown. The turtle did not swim very fast at all, but just submerged and surfaced lazily. Its breathing could distinctly be heard.

The sea was smooth; a vast congregation of jellyfish and a large shoal of mackerel were present. Most probably the turtle was feeding on the jellyfish.

"There was one fish with the turtle, about 24 inches long, very light in colour, almost whitish, but was not seen to attach itself to turtle, but would swim along underneath or close to the turtle, and then dart out and back again" (Mr. A. T. Vickery, in litt.).

De 46, 11.iv.1970, dead, Berry Beach, 1½ miles SW of Hartland Point (North Devon).

Mr. A. F. Stimson, British Museum (Natural History) (in litt., 4.v.1970), Mr. D. Garrett, Receiver of Wreck, Appledore, (in litt., 19.v.1970).

The carcase was in such an advanced state of decomposition that it had to be destroyed. The stranding was reported to the British Museum (Natural History) by Mr. D. Garrett, who on my request supplied me with further information.

Five ridges were observed on the carapace; the estimated length of the carapace was about 5 ft. (ca. 152 cm); the weight was estimated to have been approximately 4-5 cwt. The head and one of the fore flippers were missing.

The presence of ridges on the carapace, and the size definitely show this specimen to have been a Leathery Turtle.

De 47, ♀, 15.vi.1916, alive, 35 miles W by S of Bishop Rock (Cornwall): BM 1916.6.23.1, cast and skeleton.

"The Times", 16.vi.1916: 5, col. 6: Turtle.

H. W. Parker (1946: 634, fig.), Taylor (1948: 10, 26; 1963: chart 8), E[llison] (1949: 9), Ellison (1950a: 15), M. A. Smith (1951, 1954, 1964, 1969: fig. 84), Turk & Penhallurick (1966: 6): *Dermochelys coriacea*.

The turtle had become entangled in a submarine net.

"The Times" gave the length as being about 8 ft (244 cm), the width as 4 ft. (122 cm), and the weight as being nearly a ton. This estimate of the weight must have been grossly exaggerated; a weight of 1000 lb is more likely. The total length actually was 7 ft. (213 cm).

De 48, De 49.

In 1756 two Leathery Turtles were captured off the Cornish coast, and

these are among those that have been mentioned in literature over and over again. Borlase (1758: 285) stated that one of these turtles was taken four leagues south of Pendinas Castle, and that it was brought alive to Truro on July 3rd, 1756 (De 49); the other was taken off Land's End "at the same time" (De 48). Pennant (1769: 1) mentions both turtles, stating that they had been taken in Cornwall (no exact localities being indicated) "a little after *Midsummer*." Most subsequent authors will not have consulted Borlase's original account, but they will have used the data such as these were given by Pennant, or they will have repeated the information that others had taken from Pennant's works. It may be that good stories improve when they are told over and over again, but old records that are copied many times certainly do not improve; they tend to become mutilated, and errors may creep in. In the present instance this means that the actual localities are no longer mentioned, that most authors refer to only one turtle (which sometimes is stated to have been seen only), and that Pennant's rendering of the date as "a little after *Midsummer*" has caused some confusion. Continental authors will not have been aware that in England one used to define summer as the season consisting of the months of May, June, and July, that 'Midsummer' is a concept linked with June 21st, and that June 24th is 'Midsummer-day'. Besides, the continental authors translated "a little after *Midsummer*" in various ways. Latreille (in: Sonnini & Latreille, 1801-1802: 61) wrote: "vers le milieu de l'été" (at about the middle of the summer). De la Cépède (1788a: 115, 1788b: 146) stated: "un peu après le milieu de l'été" (a little after the middle of the summer) and Bechstein (1800: 140) likewise wrote: "etwas über die Mitte des Sommers hinaus." To other authors 'a little after the middle of the summer' is equal to 'towards the end of the summer', and this was the idea of Daudin (1801-1802: 64, "vers le fin de l'été"), and of Schlegel (1838: 11, "dans les derniers temps de l'été"). From the end of the summer it is but one step to the beginning of the autumn, and Patterson (1914: 2) placed the event "in the early autumn". Moreover, many people will place 'the middle of the summer' much later than the English 'Midsummer', and the various translations of Pennant's perhaps more literary rendering of the date has created a false impression about the time of the year at which the turtles were captured.

Lozano Cabo & Quiroga (1969: 17) erroneously give the year of capture as 1956, instead of 1756.

A few authors mention two turtles from Cornwall, taken in 1756, but most authors mention only one, not indicating which one they meant. Therefore, all references to these Cornish specimens have been included in the following list.

- Borlase (1758: 285; pl. xxvii fig. iv): Turtle.
 Pennant (1769: 1): Spinous Tortoise.
 Pennant (1776a, b: 7; 1812: 9; 1818: 8): Coriaceous Turtle.
 Schneider (1783: 315), Daudin (1801-1802: 64), Latreille (in: Sonnini & Latreille, 1801-1802: 61), Shaw (1802: 78), De la Cépède (1802b: 151), Griffith & Pidgeon (1830: 94), Anonymus (1841: 47): *Testudo coriacea*.
 Martyn (1785, vol. 2, sign. 4 U: (1)): Mediterranean Turtle.
 De La Cépède (1788a: 115; 1788b: 146; 1799: 47; 1802a: 177), Lacépède (1825: 73; 1836, and n.d.: 36; 1839: 139; 1847: 140; 1856: 152): Le Luth.
 Goldsmith (1791: 360; 1804: 27; 1805: 191; 1816: 190): Great Mediterranean Turtle.
 Goldsmith (1833: 29; n.d. a: 29; n.d. b, c: 317): Great Mediterranean Turtle (or Coriaceous Turtle).
 Goldsmith (1840: 342; 1862: 342): Great Mediterranean Turtle (or Coriaceous Turtle), also called the Leathery Turtle.
 Bechstein (1800: 140): Lederartige Schildkröte.
 Fleming (1828, 1842: 149): *Coriudo coriacea*.
 Duméril & Bibron (1835: 564), Jenyns (1835: 290), Couch (1838: 30), Th. Bell (1838: 15; 1849: 16), Storer (1840: 16), Chenu & Desmarest (1856: 40), Agassiz (1857: 373), Tickell (1862: 370), Cooke (1865: 184; 1893: 183), Frédo (1865: 485; 1866: 541), Taslé (1872: 181), Schreiber (1875: 512), Cornish (in: Couch, 1878: 30), Huizinga, n.d. a: 165, note; n.d. b: 121, note), J. Clark (1906: 307), Heldt (1933: 29): *Sphargis coriacea*.
 Oken (1836: 588): *Sphargis coriacea, mercurialis*.
 Bourjot (1838: 269): *Sphargis* Luth.
 Alessandrini (1838: 357, 359): *Dermochelydis tuberculata*.
 Schlegel (1838: 11): *Sphargis [mercurialis]*.
 Anonymus (1843: 540), Lacépède (1833: 355; 1847: 140): *Sphargis mercurialis*.
 Thom. Brown (1840: 799).
 Hartwig (1861: 152): *Testudo Midas*.
 Strauch (1865: 134), Sauvage (1885: 115), Sears (1887: 89), Patterson (1914: 2), Rope (1934: 210): *Dermatochelys coriacea*.
 Lyell (1868: 366; 1872, 1875: 369): *Chelonia coriacea*.
 Pellegrin (1904: 321), Schreiber (1912: 765), Navarro Martin (1941: 363), Brongersma (1968f: 222): *Dermochelys coriacea*.
 Lozano Cabo & Quiroga (1969: 17): *Dermochelis coriacea*.

De 48, about 3.vii.1756 (i.e., "at the same time" as De 49), off Land's End (Cornwall).

Borlase (1758: 285): Turtle.

After it was bled to death, the weight was six hundred and three quarters (about 307 kg).

De 49, 3.vii.1756, four leagues S of Pendinas Castle (i.e., Pendennis Castle, near Falmouth), Cornwall.

Borlase (1758: 285, pl. xxvii fig. iv): Turtle.

The turtle was caught in mackerel nets, and it was brought alive to Truro on July 3rd, 1756. The length from the tip of the beak to the end of the carapace was 6 ft. 9 in. (about 206 cm), the width between the tips of the

extended fore flippers was 10 ft. 4 in. (about 315 cm); it was "adjudged" to weigh 800 lb (about 363.5 kg).

De 49bis, ♀, 29.vii.1971, alive, off The Lizard (Cornwall). RMNH 16803 (Pls. 2, 3),

Anonymus (1971a, b).

The turtle had become entangled in the lines of lobster pots. It was landed at Cadgwith by Mr. B. Bolitho. From there it was brought to the Coastguard Station, The Lizard, and later to Padstow. The turtle was preserved by injecting it with formalin. After having been crated it was brought by lorry to Southend on Sea, and flown from there to Zestienhoven (Rotterdam Airport). Eventually, it came to the Leiden Museum. The specimen was acquired through the intermediary of the British Museum (Natural History).

Total length	172	cm
Carapace, long in straight line	135	cm
" " along curve of median keel	142	cm
" " along paramedian trough	143	cm
" " along curve of paramedian keel	148½	cm
" greatest width	76	cm
Height of body	42½	cm
Width across spread fore flippers	202	cm
Right fore flipper, long from elbow to tip	78	cm
Head, long	249	mm
" wide	206	mm
Tail, long (from posterior edge of vent)	91	mm
" high	60.4	mm
" wide	36.7	mm
" extending beyond carapace	32	mm
Weight (inclusive of 4 gallons of formalin)	240	kg
to be subtracted: 4 gallons of formalin	16	kg
	<hr/>	
	224 kg (494 lb).	

Numerous barnacles (*Stomatolepas elegans* (Costa)) were present in a semicircle (above, in front, below) at the base of the fore flippers; many of these barnacles were also present at the base of the hind flippers. Some of the barnacles have been deposited in the collections of the British Museum (Natural History), London, and in those of the County Museum, Truro.

At the sides, where the carapace and plastron are connected, the fat layer is 45-55 mm thick.

In the stomach and also farther posteriorly in the gut plastic bags were found. The further remains of the gut were examined by Dr. W. Vervoort, Leiden, who reports that the gut contained remains of jellyfish, of fish, and of green algae. There is one large piece of jellyfish (probably *Cyanea*), and in the intestine small fragments of jellyfish with distinct nematocysts

are found. Also present are fragments of tissue, of bones, and of bloodvessels with erythrocytes, which must derive from fish. Considering the fragments of the bloodvessels, it appears that the fish eaten by the turtle must have been of some size, and that it was not just a small fish accidentally ingested together with a jellyfish. One of the samples contained relatively much sand and cristalline material.

The right fore flipper at about three quarters of its length (measured from the elbow) shows an oval hole at 30 mm from the posterior border; the length of the hole (parallel to the border of the flipper) is 42 mm, its width is 19 mm. This fact is mentioned here, as circular holes in the fore flippers of nesting female Leathery Turtles have been recorded by Bacon & Malipant (1971: 6, 8), and Bacon (1971: 26) mentions the presence of round holes with a diameter of one inch, and one instance of a definitely oblong hole. It is suggested by these authors that the holes may be due to tagging, the tag having been lost. As tagging is done on nesting beaches, and if the hole in the flipper of the present specimen would be due to tagging, this would imply that this female had nested already at least once before, and that at least a year ago. The length of the carapace of the present female (143 cm along the paramedian trough) comes within the range of variation (125 cm-185 cm, mean 158 cm) observed by Bacon & Malipant (1971: 7) in nesting females in Trinidad. Although the length of the carapace in itself would not exclude the possibility of this Cornish female being mature, one must not forget that a year earlier it was smaller, and at that time it may well have been under the minimum length of the breeding females. Besides, from the ovaries we concluded that the specimen was not yet fully mature. The holes found by Bacon & Malipant are much closer to the elbow than in the Cornish specimen. The hole in the flipper of the Cornish female is in a place where one would not place a tag, because so close to the tip of the flipper the chances of damaging and losing the tag are very great.

Although no explanation can be given about what caused the holes it seemed worth while to report the presence of such a hole in what we consider a not yet mature female, which cannot have been tagged on a nesting beach.

Further notes upon this turtle will be published in the near future.

De 50, 1835, alive, Falmouth Harbour (Cornwall).

This record was found as a handwritten note in an interleaved copy of J. Couch's "Cornish Fauna", once the property of his son R. Q. Couch²⁾:

²⁾ When I examined this copy it was in the possession of Prof. Dr. L. B. Holthuis, Leiden, who has now presented it to the County Museum, Truro, Cornwall.

"Falmouth Harbour 1835". Perhaps this is the same turtle of which Couch (1838: 30, *Sphargis coriacea*) wrote: "...I have been informed of the occurrence of another specimen, which however was not secured."

De 51, alive, coast of Dorsetshire, near Bridport.

Pennant (1776a, b: 8; 1812: 10; 1818: 8, [Donovan] (1807: 29, no. 420): Coriaceous Tortoise.

Martyn (1785, vol. 2, sign. 4 U: (1)): Mediterranean Turtle.

Shaw (1802: 78), Anonymus (1806: 43, no. 1021), Allingham (1924: 44): *Testudo coriacea*.

Gray (1831: 51; 1844: 52; 1847: 133; 1855: 71; 1873a: 96), Th. Bell (1838: 15; 1849: 16), Agassiz (1857: 373), Tickell (1862: 370), Cooke (1865: 184; 1893: 183), Cambridge (1894: 90, 93), Gadow (1901: 334): *Sphargis coriacea*.

Anonymus (1832b: 38; 1834: 37; 1835, 1836: 36; 1837a: 33; 1837b: 30; 1838a, b: 30): Coriaceous Turtle.

Thom. Brown (1840: 799).

G. A. Boulenger (1889: 10), Mertens (1926: 12), Aguilar-Amat (1928: 102), Taylor (1948: 10, 26; 1963: chart 8), E[llison] (1949: 9), Ellison (1950a: 15), M. A. Smith (1951, 1954, 1964, 1969: fig. 84), Dalton (1951: 135), Navarro Martin (1941: 363): *Dermochelys coriacea*.

Strauch (1865: 134), Patterson (1914: 2), Rope (1934: 210): *Dermatochelys coriacea*.

Lozano Cabo & Quiroga (1969: 7): *Dermochelis coriacea*.

The specimen was originally in the Leverian Museum. I have not been able to trace the date of its capture. The fact that it was not mentioned by Pennant in 1769, but that it was included by him in 1776, may perhaps be an indication that it was taken in the intervening period, and it is not unlikely that it was acquired after the collections had been moved to London in October, 1774. When Sir Ashton Lever disposed of his museum by means of a lottery (March, 1786), the collection passed into the possession of Mr. J. Parkinson, who found the winning ticket among the effects of his late wife (W. J. Smith, 1960). In 1806 the collection was auctioned, and the Leathery Turtle (Anonymus, 1806: 43) was purchased by E. Donovan for £ 1.16.-. In his catalogue of the London Museum [Donovan] (1807: 29, no. 420) writes: "Coriaceous Tortoise. This marine animal was captured near Bridport, in Dorsetshire, and when alive weighed nearly half a ton. The flesh is reputed unwholesome; the hide of the back is of the same texture as fine tortoiseshell. This is the only British specimen of the Coriaceous Tortoise known to be extant." In 1818 the turtle was auctioned once more. Allingham (1924: 44), referring to this sale, comments as follows: "Testudo coriacea, captured near Bridport, Dorsetshire. Nearly 6 feet [185 cm] in length and 4 [123 cm] in breadth. The only British specimen known." This time the turtle came into the possession of the British Museum.

Gray (1873a: 96) gives the length of the shell as being 59 inches (about 150 cm).

How [Donovan] (1807: 29) came to say that the texture of the hide was like fine tortoise-shell, I cannot explain.

It seems that the specimen is no longer in the British Museum (Natural History), at least I have not been able to trace it. There is some indication in the correspondence files, that the turtle was sent in exchange to another museum in Great Britain.

De 52, 1.ix.1954, alive, off Abbotsbury (Dorsetshire).

Dalton (1956: 126), Ellison (1959: 28): *Dermochelys coriacea*.

Taylor (1963: chart 8): unidentified.

Length 4 feet (ca. 122 cm), wide $2\frac{1}{2}$ feet (ca. 76 cm); weight, about 400-500 lb. (182-227 kg). The turtle was accompanied by a school of Pilot Fishes.

It is probably this turtle to which Mrs. Joan Williams refers in the "Dorset Evening Echo" of March 24th, 1965: "Some years ago — about seven or eight — I was with my husband on the beach at Abbotsbury watching the fishermen bringing in their catch when, alongside the boat, there was a large dark shadow. I called out and we all watched this, which turned out to be a dark green turtle with a black and white fish on its back. As we watched, for just a few seconds, it back-paddled and went away."

"The newspaper reports next day were somewhat exaggerated as they stated that the fishermen went into the sea and tried to turn the turtle over. This was not true as those of us who were there just stared for the very short time this turtle was visible."

De 53, 7.xi.1963, dead, Pennington Marshes, near a point known as The Butts, Lymington (Hampshire).

Reported to the British Museum (Natural History) by Mr. Oliver Hook. The turtle was found floating in the water, recently dead. The length was estimated to be 6 ft. (ca. 183 cm).

De 54, 1964, dead, at the base of the cliff at Hampstead, Isle of Wight (Hampshire).

Reported to the British Museum (Natural History) by Mr. M. Bray (letter and photograph received 3.vi.1964): "It is approximately three feet [ca. 91.5 cm] in length by two feet [ca. 61 cm] in width, and as you can see is somewhat damaged." The carapace was "heavily impregnated with yellow clay."

De 55, 21.x.1967, alive, 3 miles ENE of Whitby Buoy.

Mr. D. Young (in litt., x.1967).

The turtle was on the surface, heading south. The ridges on the carapace were observed. The colour of the very large shell was described as being black with a white and grey leopard pattern.

De 56, 25.x.1871, alive, about a mile from the harbour, Bridlington Bay (Yorkshire).

"Hull News", Saturday, 28.x.1871; "Bridlington Free Press", Saturday, 28.x.1871; "Hull and Eastern Counties Herald", 2.xi.1871: 7.

A. S. Bell (1872), Cooke (1893: 184), Grabham (1907: 321): *Sphargis coriacea*.

Roebuck (in: Clarke & Roebuck, 1881: 94): *Dermatochelis coriacea*.

Distant (1898: 500), Taylor (1948: 10, 26; 1963: chart 8), E[llison] (1949: 9), Ellison (1950a: 15), M. A. Smith (1951, 1954, 1964, 1969: fig. 84), Rimington (1956: 371), Holgersen (1960a: chart), Brongersma (1969: 79): *Dermochelys coriacea*.

The "Hull News" and "The Hull and Eastern Countries Herald" both published the same account:

"TURTLE CAUGHT IN BRIDLINGTON BAY"

"On Wednesday afternoon, John Barnett and Wm. Sawden, of Bridlington Quay, fishermen, when in the bay, caught in their net a turtle, which they towed into the harbour and landed on shore between seven and eight p.m. Its length is about seven feet and three and a half feet across its body, which is very bulky, and conjectured to weigh from six to seven cwt. This is the first turtle that has ever been caught or seen here, and has apparently made its appearance here most opportunely to impart additional gusto to the grand banquet about to be given to the Prince and Princess of Wales and other distinguished guests at Scarborough on Monday next. Most probably a large sum will be realised by this valuable fish. In June, 1870, a large turtle was caught in the Downs, and taken into Ramsgate. It was a puzzle to all who saw it as to how it came there. Some supposed that it might have got into the Gulf Stream; while others thought it had come with a ship that had been wrecked. The same may be surmised as to how this natural production of the southern seas got into Bridlington Bay."

The "Bridlington Free Press" gave the following version:

"BRIDLINGTON BAY. — Mr. John Barnett, whilst fishing with drift nets for herrings, about a mile from the harbour, on Wednesday night, observed something unusual disturbing them, and on hauling in, found entangled amongst the nets, an immense turtle, which he succeeded in getting ashore alive and uninjured. It is undoubtedly of the Sea Tortoise genus, but in the flappers and shell, differs from those described in the works on natural history, and also from any known to the many sailors who examined it. It measures from the snout to the tail, 8 ft; across from the tips of the flappers, 8 ft; round the thickest part of the body, 7 ft. 6 in; and is estimated to weigh 1000lbs. We understand that although turtles at wide intervals have been taken in the seas around the British Islands, there is no account of any so large as this. Since writing the above, we have been informed that it died on Friday morning, and that it belonged to the species known as the Leathery Turtle."

It is impossible to say which of the measurements is correct: total length 7 ft. (ca. 213 cm) or 8 ft. (ca. 244 cm), weight between 6 and 7 cwt (ca. 305

to 356 kg) or 1000 lb (ca. 454 kg). A. S. Bell (1872) apparently obtained his information from the same source as the "Bridlington Free Press".

The turtle dying on Friday, the Prince and Princess of Wales were saved from having to eat soup made from a Leathery Turtle.

De 57, ii.1873, Yorkshire.

Gray (1873b: 411, *Sphargis coriacea*) wrote: "A specimen of this species has this month (February 1873) been taken on the coast of Yorkshire; but I fear it has been so cut up that it will not make a skeleton."

Where Gray obtained this information and whether he has seen the specimen is not known. It is not mentioned in the registers of the British Museum (Natural History) and I could find no mention of it in Gray's files of correspondence. It has not been mentioned in the "Bridlington Free Press" (Mr. S. T. Thompson, Bridlington, in litt. 24.iv.1967), not in the "Hull News", nor in the "Hull and Eastern Counties Gazette" (Mr. G. H. O. Burgess, Kingston upon Hull, in litt., 21.iii.1967; Mr. R. F. Drewery, Kingston upon Hull, in litt., 22.iii.1967), not in the "Yorkshire Gazette" and not in the "Report of the Yorkshire Philosophical Society" (Mr. O. S. Tomlinson, in litt., 5.v.1967).

It is to be regretted that no further information is available, because it would be of interest to know whether the specimen was alive or dead.

De 58, 13.xi.1961, dead, on shore at Jackson's Corner, between Ingoldmels and Skegness (Lincolnshire).

Holgersen (1960a: chart): *Dermochelys coriacea*.

Reported to the British Museum (Natural History) by H. Britannic M. Coastguard, Skegness.

Length of shell nearly 5 feet (nearly 152 cm).

De 59, 17.ii.1956, dead, North beach, Great Yarmouth (Norfolk).

Ellison (1959: 28), Holgersen (1960a: chart), Taylor (1963: chart 8): *Dermochelys coriacea*.

Reported to the British Museum (Natural History) by H. Britannic M. Coastguard, Great Yarmouth. The incomplete skull was saved for the museum by the Fisheries Laboratory, Lowestoft.

Five ridges were noticed on the shell; carapace, long 4 ft. 6 in. (137 cm), wide 3 ft. (91.5 cm).

De 60, **De 61**, ca. 11.xi.1913, alive, off Lowestoft (Suffolk).

Patterson (1914: 1), Rope (1934: 210): *Dermatochelys coriacea*.

Taylor (1948: 10, 26; 1963, chart 8), E[llison] (1949: 9), Ellison (1950a: 15), M. A. Smith (1951, 1954, 1964, 1969: fig. 84): *Dermochelys coriacea*.

Patterson (1914: 1) reported upon the occurrence of these turtles. It was said that two specimens were seen together, but only one was captured. A newspaper report of November 11th, 1913 stated the weight to have been between 3 cwt and 4 cwt; a later report gave the weight as being 18½ cwt, which certainly is grossly exaggerated.

IRELAND

EIRE

De 62, 4.viii.1957, dead, at the mouth of the Ray River, 4 miles SW of Horn Head, Falcarragh (Co. Donegal).

[Kertland] (1957: 13, pl. 4), Taylor (1963: 8), Brongersma (1969: 77): *Dermochelys coriacea*.

[Kertland] wrote about this specimen: "It was nearly 7 feet (213 cm) long and partly decomposed; it can hardly have arrived alive, as some nautical oaf had put a couple of 303 bullets through its head."

Mr. J. Smiley (in litt., 23.viii.1957) reported this turtle to the British Museum (Natural History). In his letter the length from head to tail is stated to have been 6 ft. (183 cm), the width across the widest part of the back 3 ft. 6 in. (106.5 cm); it had a large hole of 9 by 6 inches (ca. 23 × 15 cm) in its back.

De 63, 9.viii.1959, alive, a few yards from Inishgallon (a small island, which is about half a mile off the coast of Keel, Achill Island, Co. Mayo) (Pl. 6).

Newspaper report, (10.viii.1959): Green Turtle.

Taylor (1963: chart 8), Brongersma (1964: 25): *Chelonia mydas*.

Stephen (1961: 47): *Dermochelys coriacea coriacea*.

Brongersma (1968d: 44): *Dermochelys coriacea*.

This turtle was mentioned in a newspaper report (clipping in the Stranded Turtles File of the British Museum (Natural History)) as being a Green Turtle. On this basis it was indicated by Taylor (1963: chart 8) as *Chelonia mydas*, and this record was also mentioned by me (Brongersma, 1964: 25). It had escaped Taylor's and my notice that this Irish specimen had been recorded as a Leathery Turtle by Stephen (1961: 47) in his paper on Scottish Turtle records. Unaware of this I made some inquiries in which I received full assistance from the Irish Embassy at The Hague, from the Gárda Síochána at Achill Sound, and from the Irish press. Mr. W. J. Sweeney, Achill Sound (in litt., 1.ii.1965), kindly confirmed that it was indeed a Leathery Turtle. Mr. A. P. Huet, Dublin (in litt., 25.iii.1965), who was a member of the group that captured this turtle, gave me further information

about the exact locality, and he sent me two photographs of it. Weight between 4 and 5 cwt (203-254 kg). The specimen was put back into the sea.

De 63bis, ♂, 16.vii.1971, alive, outside High Island, Co. Cork. RMNH 16802.

"The Cork Examiner", no. 47.706, 17.vii.1971: 1.

The turtle had become entangled in the lines of lobster pots; it was taken by Messrs. J. L. Glanton & Th. O'Sullivan. It was purchased on behalf of the Leiden Museum by Mr. F. M. J. van Beurden, deputy secretary of Leiden University, who was spending his vacation in the neighbourhood. The turtle was frozen, crated, and shipped to Rotterdam.

Total length	190 cm
Carapace, long in straight-line	142½ cm
" " along curve of median keel	150½ cm
" " along paramedian trough	150 cm
" " along curve of paramedian keel	155 cm
" greatest width	78 cm
Width across spread fore flippers	230 cm
Right fore flipper, long from elbow to tip	83.5 cm
Head, long	278 mm
" wide	222.7 mm
Tail, long	167.5 mm
" high	81.5 mm
" wide	49.7 mm
" extending beyond carapace	157 mm
Weight of the frozen turtle	267 kg (589 lb).

A few barnacles (*Stomatolepas elegans* (Costa)) were present on the shoulders and at the base of the hind flippers; one barnacle had settled on the palate.

At the sides (where the carapace and plastron join) the layer of fat varied in thickness from 47 to 62 mm.

From the gut were taken three species of Trematoda.

The contents of the gut were examined by Dr. W. Vervoort, Leiden, who reports that a sample taken from the stomach contained partly digested remains of algae and distinct remains of a jellyfish. A sample taken from the intestine contains fragments of tissue, membranous material, a small Pteropod shell (0.8 mm) and some sand and cristalline material. The fragments of tissue have the same structure as those found in the gut of a Leathery Turtle from Cornwall (De 49bis), however no blood corpuscles were found. The membranous material could not be identified; it does not contain any nematocysts.

Further notes on this Leathery Turtle will be published in the near future.

De 64, 1.x.1960 (or 30.ix.1960), alive, 5-7 miles SW of the Old Head of Kinsale (Co. Cork).

Mr. L. S. Atkins (in litt., 1.x.1960).

Atkins (1960: 189), Taylor (1963: chart 8), Brongersma (1969: 87): *Dermochelys coriacea*.

The turtle was caught by a Norwegian fishing-boat: "They were using shark line with herring bait hook" (Atkins).

Total length 6 ft. 7 in. (203 cm); wider part of body 2 ft. 10 in. (87 cm); weight 455 lb (ca. 207 kg).

De 65, 2.vi.1962, alive, 2 miles S of Ballycotton (Co. Cork).

Atkins (1962: 82): *Dermochelys coriacea*.

Length approximately 5½ ft. (169.5 cm); weight 700-800 lb (318-364 kg). The turtle was released.

De 66, ca. 13.viii.1949, alive, Baginbun, Fethard (Co. Wexford).

"News Chronicle", 13.viii.1949.

Ellison (1959: 28), Taylor (1963: chart 8): *Dermochelys coriacea*.

The turtle was captured by Mr. Hearne; an offer to send it to the Dublin Zoo was declined, and the turtle was released.

Length 5 ft. (154 cm); weight, a quarter of a ton (560 lb = 254 kg).

De 67, 22.x.1960, dead, South Strand, Greystones (Co. Wicklow).

Mr. J. P. Jackson (in litt., 17.xi.1960).

Taylor (1963: chart 8): *Dermochelys coriacea*.

The turtle was found lying on its back on the beach. Length from the beak to the supra-caudal margin of the carapace approximately 5 ft. 3 in. (ca. 162 cm). "The weight was estimated as approximately 7-8 cwt [355-406 kg]. I would consider this estimate as quite definitely conservative" (Jackson, in litt.).

DENMARK

De 68, ♀?, 2.ix.1965, alive, 2 miles West of Nymindégab, off Hvide Sande. Naturhistorisk Museum, Aarhus.

Dr. P. Bondesen (in litt., 4.xi.1965).

"Freie Welt", 1965, no. 41 (not seen).

Thamdrup (1966: 20): Laederskildpadde.

The turtle was taken by skipper Erling Christensen. It weighed 340 kg.

De 69, about Christmas, 1948, dead, Sjaellands Odde, island of Seeland.

Hvass (1950: 130-133), Willgohs (1956: 542), Curry-Lindahl (1960: 143), Holgersen (1960a: chart): *Dermochelys coriacea*.

A few days later, the carcase was washed away during high tide, and it has been assumed, that the same carcase was stranded in Sweden (De 70).

Pfaff (1950: 64, *Dermochelys coriacea*) and Hellmich (1956: 88; 1962: 84, *Dermochelys coriacea coriacea*) mention the species from the Southern Kattegat, and their record is, of course based upon De 69 and De 70. Leutscher (1966: 78, *Dermochelys coriacea coriacea*) mentions the Leathery Turtle as "occasionally penetrating as far north as the Denmark Straits"; apparently he means the straits between Denmark on the one side, and Norway and Sweden on the other side (i.e., the Kattegat), and not the Denmark Strait between Iceland and Greenland.

SWEDEN

De 70, 22.i.1949, dead, Skalderviken, Skåne. Zoological Institute, Lund, skeleton.

Berlin (1949: 195-200, fig.), Hvass (1950: 130), Willgohs (1956: 542), Holgersen (1960: 134, chart), Curry-Lindahl (1960: 143), Mertens (1952, 1960b, 1964, 1968a: 28): *Dermochelys coriacea*.

Perhaps the same carcase as recorded under De 69. We do not know how long it takes a carcase to desintegrate whilst floating in the sea, but it seems remarkable that (even in the cold season) the specimen still would be in a fairly good condition after nearly a month.

Length from tip of beak to posterior tip of carapace 170 cm; length of carapace 152 cm, width 98.5 cm.

GERMANY

De 71, viii.1930, dead, Friederikensiel, district Jever (not far from Wangeroog).

Greve (1931: 30-31, fig.), Flower (1933: 752), Mertens (1938: 2; 1952, 1960b, 1964, 1968a: 28), Navarro Martin (1941: 363), Willgohs (1956: 541), Holgersen (1960a: 134, chart), Schäfer (1962: 19), Brongersma (1969: 77), Pritchard (1971: 32): *Dermochelys coriacea*.

Lozano Cabo & Quiroga (1969: 17): *Dermochelis coriacea*.

Total length 203 cm; length of carapace 150 cm; width of carapace 90 cm; width across spread fore flippers 220 cm; weight estimated to be over "7 Zentner" (over 350 kg).

The turtle had severe injuries to the head; from behind a great gash reached to the middle of the back, suggesting that the animal probably had been hit by a ship's propeller.

De 72, 20.x.1965, alive, Prohner Wiek, off Stralsund, Baltic Sea; Meereskundliches Museum, Stralsund, stuffed.

"Das Neue Deutschland", vol. 20, nr. 291, 22.x.1965, Berlin: 8, fig.; 26.x.1965; 3.xi.1965; "Azet", "Abendzeitung", Leipzig, 23.x.1965; 8.xii.1965, fig.; 27.vi.1966; 3.viii.1966; "Leipziger Volkszeitung", 22.x.1965; "Freie Welt", no. 46, 2.xi.1965, 3 figs.; B[erliner] Z[ei]tung am Abend, vol. 18, no. 257, 3.xi.1966; "Das Tier" (1966: 44, fig.). B[aron] (1966: 51): Lederschildpad.

Lanitzki (1967: 44), Peters (1967: 385), Mertens (1968a: 28): *Dermochelys coriacea*.

The turtle was taken alive in a fishtrap. It was brought to the Zoo at Rostock, with the intention of sending it to the Leipzig Zoo, but after a few days the specimen died. The carcase was turned over to the Meereskundliche Museum at Stralsund, where it was mounted for exhibition. The turtle has been on show in various museums in East Germany. The director of the Stralsund Museum, Dr. E. Streicher (in litt., 11.xi.1965) wrote that a full report would be published by him in due course.

THE NETHERLANDS

In a faunal list for the Netherlands and the Belgian part of Flanders, Maitland (1897: 16, *Sphargis coriacea*) included the Leathery Turtle; no definite localities are mentioned. Navarro Martin (1941: 362, *Dermochelys coriacea*), Lozano Cabo & Quiroga (1969: 17, *Dermochelis coriacea*) mention the species as occurring in The Netherlands, but the only locality mentioned by Lozano Cabo & Quiroga for the Netherlands, in fact is situated in Germany (De 71, Friederikensiel). Schlegel (1860, 1870: v, *Chelonia coriacea*) mentions the possibility of this species straying into the North Sea. Van der Hoeven (1855: 548; 1852-1856: 330; 1858: 321; 1859: 548, *Chelonia coriacea*, in the subgenus *Dermatochelys*) states that the species has been found in the North Sea (cf. De 75).

De 73, ♂, 4.viii.1968, dead, Ameland, at KM 5 (i.e., 2 km west of Hallum), Friesland. RMNH 14914, skeleton.

"Leeuwarder Courant", 217th year, no. 182, 5.viii.1968 (edition for the islands, exclusive of fig.; Leewarden edition, 1 fig.). "Leidsch Dagblad", no. 32552, 5.viii.1968, p. 3; no. 32553, 6.viii.1968, p. 3, fig.; no. 32544, 7.viii.1968, p. 3, fig. "Het Parool", 28th year, no. 7225, 5.viii.1968; no. 7227, 7.viii.1968. "Volkskrant", 47th year, no. 13315, 5.viii.1968, p. 1; no. 13318, 8.viii.1968, p. 4. "Algemeen Dagblad", 6.viii.1968, p. 5. "Nieuwe Leidse Courant", 49th year, 8.viii.1968, p. 3, fig. "Nieuwe Haagse Courant", 8.viii.1968, fig. "De Telegraaf", 75th year, no. 25125, 10.viii.1968, p. 15, fig. "Leidsche Post", 14.xi.1968.

Anonymus (1968: 21).

F[aber] (1968: 137).

Brongersma (1969: 76-83, text-fig. 1, pl. I figs. 1, 3, pl. II, pl. III fig. 2, pl. IV), Pritchard (1971: 32): *Dermochelys coriacea*.

The specimen has been dealt with at some length in a previous paper (Brongersma, 1969: 76). A deep transverse gash divided the carapace into two parts; the carapace also showed some holes that may have been caused by bullets. Apparently the turtle had met with an accident earlier already. The narrow, posterior process of the carapace is lacking, and the tail is fully exposed. The posterior part of the carapace is covered by skin of a texture different from that more anteriorly, and it seems as if this part of the skin has regenerated. Some more or less healed cracks are present in the bony carapace.

Total length, 244 cm (8 feet); weight 485 kg (1069 lb). The two pieces of the carapace fitted together have a length of about 158 cm (about 5 feet 2 inches), and originally (when the posterior process was still present) the carapace may have had a length of at least 170 cm (5 feet 7 inches).

De 74, 29.v.1961, dead, drifting past the Lightship "Texel" ($53^{\circ}1.5'N$, $4^{\circ}22'E$; 12.5 nautical miles due west of the island of Texel).

Reported by Ir. L. Otto, Royal Netherlands Meteorological Institute, who sent colour slides to the Rijksmuseum van Natuurlijke Historie, Leiden.

"Leeuwarder Courant", 217th year, no. 182, 5.viii.1968, p. 1. "Leidsch Dagblad", no. 32553, 6.viii.1968, p. 3. "Het Parool", 28th year, no. 7227, 7.viii.1968. "Volkskrant", 47th year, no. 13318, 8.viii.1968, p. 4. "Nieuwe Leidse Courant", 49th year, 8.viii.1968, p. 3. "Nieuwe Haagse Courant", 8.viii.1968.

Anonymus (1968: 21).

F[aber] (1968: 137).

Brongersma (1969: 77), Pritchard (1971: 32): *Dermochelys coriacea*.

The colour slides received from Ir. Otto showed that the turtle was partly decomposed; part of the gut was hanging down in the water. It seems that the anterior part of the head was lost, either by decomposition, or perhaps having been cut off by a ship's propeller.

De 75, 17.vii.1777, alive, off Domburg, island of Walcheren, Zeeland.

Van Iperen (1778: 623): Schild-padde.

Van der Hoeven (1855: 548, note; 1852-1856: 330, note 1; 1858: 321, note 1; 1859: 548): probably *Chelonia coriacea* (in subgenus: *Dermatochelys*).

Van Bemmelen (1866: 530): probably *Sphargis coriacea*.

Huizinga (no date, a: 164, note 1; b: 121, note 1), Anonymus (1905b): *Dermochelys coriacea*.

Van Kampen & Heimans (1927: 51): *Dermochelys coriacea*?

Brongersma (1961: 39): not identified.

Brongersma (1969: 76), Pritchard (1971: 32): *Dermochelys coriacea*.

The turtle was sighted by fishermen, but it was not captured as erroneously stated by Van Bemmelen and by Huizinga. At first it was taken for a buoy, then for an overturned boat, but when the fishermen came close to it, they

recognized it for a turtle. The turtle was estimated to be as long and as broad as the largest hatch of a fishing boat, and Van Iperen (1778: 623) was able to inform us that this meant the length of the turtle (measured longitudinally over the carapace) being not much less than five feet Rhineland measure, i.e., 157 cm, or 5 feet $1\frac{3}{4}$ inch British measure. As the carapace, or part of it, will have been about all that was seen, we may take it that the length mentioned by Van Iperen was that of the shell. And with a shell this size it must have been a Leathery Turtle.

In a previous paper I considered the information too vague to allow of an identification (Brongersma, 1961: 39), but after having gone through many more reports on turtles from European waters, I am convinced that the turtle sighted off Domburg must be referred to *Dermochelys coriacea*.

BELGIUM

Maitland (1897: 16, *Sphargis coriacea*) included the Leathery Turtle in a faunal list for Belgian Flanders and the Netherlands, but no information is given about the species really having been found in Belgium. Navarro Martin (1941: 362, *Dermochelys coriacea*) also mentioned the species for Belgium, but no proof is given. As far as I am aware there is no definite Belgian record.

FRANCE

The occurrence of this species on the French Atlantic coast has been mentioned, inter alia, by:

- B[osc] (1804: 258): Tortue luth;
- Van der Hoeven (1855: 548; 1852-1856: 330; 1858: 321; 1859: 548): *Chelonia coriacea* (in subgenus *Dermatochelys*);
- Clermont (1859: 169), Tickell (1862: 370), Piers (1890: 470): *Sphargis coriacea*;
- Sears (1887: 88): *Dermatochelys coriacea*;
- Bureau (1898a: 330; 1898b: 18): *Sphargis coriacea*;
- Babcock (1919: 335), Angel (1923: 483), Larousse (1929: 787), Brongersma (1937: 651; 1938: 213; 1943: 244; 1953: 469), Mertens (1952, 1960b, 1964, 1968a: 28): *Dermochelys coriacea*;
- Hellmich (1956: 88): *Dermochelys coriacea coriacea*.

The reference by M[at]sch[ie] (1897b: 356), and by Schäfer (1962: 19), to the occurrence of *Dermochelys coriacea* on the Atlantic coasts of Europe also will have been based upon French records.

De 76, 25.x.1752, 2 miles NE of Dieppe and half a mile from the coast (Seine-Maritime).

- "Gazette" [de France] (4.xi.1752: 546-547): Carret.
- [Aubert] D[e] L[a] C[henaye] D[es] B[ois] (1759: 396), Valmont de Bomare (1770: 334; 1771: 49; 1775a: 225; 1775b: 54; 1776: 49), Valmont-Bomare (1800: 265): caret.

- Statius Müller (1774: 32), [Borowsky] (1783: 18): *Testudo caretta*.
 Schneider (1783: 47): no identification.
 De La Cépède (1788a: 89; 1788b: 116; 1799: 37), Daudin (1801-1802: 14), Latreille (in: Sonnini & Latreille, 1801-1802: 47), Lacépède (1802a: 151; 1825: 62; 1839: 134; 1856: 146), B[osc] (1804: 254), Landrin (1867: 113): Tortue franche.
 Bechstein (1800: 104): Riesenschildkröte.
 De La Cépède (1802b: 122), Lacépède (1833: 347): *Testudo mydas*.
 Shaw (1802: 84), Griffith & Pidgeon (1830: 82): in article on Green Turtle, but suggesting that this specimen was probably a Loggerhead.
 Descroisilles (1816: 118-119): Le Luth.
 C[loquet] (1817: 373), Voigt (1837: 85): *Chelonia mydas*.
 Wilhelm (1818: 138), Anonymus (ca. 1832a: 9): *Testudo marina*.
 Schlegel (1838: 26): probably *Chelonia cephalo*.
 Anonymus (1841: 39), Hartwig (1861: 152): *Testudo midas*.
 Hartwig (1859: 164), Frédo1 (1865: 484; 1866: 540), Hart (1869, 1882: 359): *Chelonia midas*.
 Wraxall (1860: 86): *Chelonia Midas viridis*.
 Gadeau de Kerville (1897: 156), Angel (1946: 181): *Dermochelys coriacea*.
 J. & H. Bouxin & Legendre (1931: 523, 524): *Dermatochelys coriacea*.
 Heldt (1933: 28): *Sphargis coriacea*.

The earliest description of this turtle was published in the "Gazette" of November 4th, 1752 (546-547):

"Avant-hier, il arriva ici, avec le poisson de mer destiné pour les tables de la Reine, un Carret, espèce de Tortue qui ne se trouve point dans les mers de l'Europe. Sa tête, couverte, d'une écaille noire, ressemble à celle d'une Tortue ordinaire. Il a la gueule en forme de bec de Perroquet. Depuis le défaut de la tête jusqu'au corps, est une distance d'un pied, qui n'est que cher & cartilages. L'écaille du dos, noire ainsi que celle de la tête, est bombée & cannelée. Par-devant, l'animal a deux nageoires, de deux pieds et demi chacune & il en a deux autres, chacune d'un pied, à l'extrémité du corps. Sa queue a un pied de long, & la figure de celle d'un Belier. Sous son ventre qui est couvert d'une écaille rougeâtre et marbrée, sont quatre pattes, formées de façon qu'elles peuvent lui servir de nageoires. Il est long d'environ six pieds, sur quatre de diametre, & il pese entre huit et neuf cens livres. Des Pêcheurs l'ont pris sur la côte de Dieppe."

This description leaves no doubt about this turtle being a Leathery Turtle. The black colour of the head and carapace, the black marmoration of the plastron point to this. The description of the carapace being "bombée & cannelée" points to the presence of ridges with grooves in between. Descroisilles (1816) specifically states that the shell was not covered by horny shields. Nevertheless many authors have mentioned its being a Green Turtle (tortue franche) or a Loggerhead.

Descroisilles states that it was captured 2 miles NE of Dieppe, and half a mile from the coast. Most subsequent authors state that it was thrown into the harbour of Dieppe by a gale.

Total length (Descroisilles, 1816: 118) "six pieds sept pouces" (214 cm); width "quatre pieds environ" (about 130 cm); weight between 800 and 900 livres (ca. 390-400 kg).

Two Remora's were observed with this turtle.

De 77, 15.iii.1970, dead, Sables d'Or (Côtes du Nord).

Dr. Michel Boivin, of Saint-Brieuc (in litt., 16.iii.1970).

When found by Dr. Boivin, the turtle must have been dead at least for some weeks; the head and flippers were missing. The carapace was present and some vertebrae were seen.

With his letter (addressed to Dr. A. Lucas, of the University, Brest), Dr. Boivin sent a sketch of the carapace, commenting upon the mosaic of bony platelets, and upon the seven ridges, each of which was formed by larger, keeled platelets.

Carapace, long 130 cm, wide 87 cm.

De 78, 9 and 10.ix.1925, dead, îlot de Bruc, Port-Blanc-en-Penvénan (Côtes du Nord).

"Le Temps", 20.ix.1925: 4, col. 2: tortue-luth.

J. & H. Bouxin & Legendre (1931: 524, 525): *Dermatochelys coriacea*.

Heldt (1933: 30): *Sphargis coriacea*.

Angel (1946: 181), Brongersma (1969: 79), Pritchard (1971: 32): *Dermochelys coriacea*.

According to "Le Temps", the specimen was first seen on September 9th, 1925, by a fisherman, who did not take it, as it was dead. On September 10th, it was found to have been stranded by the high tide on the rocks of the îlot de Bruc. Mr. A. Hamon and his daughters took the following measurements.

Total length, nearly 250 cm; length of the central keel, 158 cm; length of fore flipper, 90 cm; length of right hind flipper, 65 cm, of left hind flipper, 60 cm; distance between two keels, 20 cm.

J. & H. Bouxin & Legendre (1931: 524, table, note 3) give the length as being 250 cm, but they add that in reality the length may have been somewhat less, as the measurement was taken from a decaying specimen, the neck of which was swollen with gas.

De 79, De 80, De 81, vi.1957, alive, off Ushant (île d'Ouessant) (Finistère).

Anonymus (1957).

Three large turtles became entangled in mackerel drift nets of three separate drifters from Douarnenez. One taken by the "Louis-Renée" weighed

550 lb (250 kg), that taken by the "Henri-Joseph" weighed 660 lb (300 kg); the third was not brought to port, but it was put back into the sea when the skipper heard that his colleagues could not find a buyer for their catches.

Probably one of these is the Leathery Turtle, stated to have been captured off Brittany on June 5th, 1957, and of which International Photos, Paris, distributed a photograph (on June 7th, 1957) to editors of magazines; it was said that the turtle would be used in Paris to prepare turtle soup.

De 82, ca. 3.vi.1948, alive, off Le Conquet (Finistère).

"Le Télégramme", 3.vi.1948 (not seen). Mr. Alb. Lucas, personal communication.

The weight is said to have been 650 kg (1430 lb)!

De 83, 5.ix.1959, alive, Cap de la Chèvre (Finistère).

Urvoas (1959, fig.).

Holgersen (1960a: 136): *Dermochelys coriacea*.

The turtle was captured by fishermen from Morgat; the weight is given as being 400 kg. This will be the same specimen as that mentioned by Mr. J.-P. L'Hardy (in litt., 31.iii.1965) as having been brought to Morgat on September 5th, 1959; the length is stated to have been about 150 cm.

De 84, 14.ix.1964, alive, about one mile off St. Anne-la-Palud, Bay of Douarnenez (Finistère). Musée Océanographique de l'Odé, Lestonan.

Captured by skipper J. Le Pape, St. Guénolé-Penmarc'h. Information about this turtle was received from the Mayor of Douarnenez (in litt., 22.ii.1965), and from the Administrateur Principal de l'Inscription Maritime, Chef du Quartier de Guilvinec (in litt., 11.iii.1965). I saw the stuffed specimen at St. Guénolé; it is now in the museum of Mr. G.-A. Bolloré, of Lestonan (Sud-Finistère).

Length of carapace 143.5 cm. The turtle was accompanied by Pilot Fishes.

De 85, vi.1928, alive, 30 miles off Armen (which is 6 miles W of the lighthouse on the île de Sein) (Finistère).

Anonymus (1928): tortue géante.

J. & H. Bouxin & Legendre (1931: 524, 525): *Dermatochelys coriacea*.

Heldt (1933: 11, 30): *Sphargis coriacea*.

The turtle was taken in the mackerel nets of the "Emma-Paul", skipper Paul Raoul.

Total length 210 cm; length of carapace 170 cm, width 100 cm; width across spread fore flippers 235 cm; weight 350 kg.

De 86, ♀, 12.iv.1893, alive, Port Lobous, en Plogoff, not far from the Pointe du Raz, Bay of Audierne (Finistère). Muséum d'Histoire Naturelle, Nantes.

Bureau (1894: 223-228, pl. iv, iv bis), Anonymus (1925c: 114), Legendre (1925: 381), Durand (1932: 78), Heldt (1933: 11, 29): *Sphargis coriacea*.

J. & H. Bouxin & Legendre (1931: 524): *Dermatochelys coriacea*.

Aguilar-Amat (1928: 102), Navarro Martin (1941: 363): *Dermochelys coriacea*.

Lozano Cabo & Quiroga (1969: 18): *Dermochelis coriacea*.

The turtle had become entangled in the lines attached to lobster pots.

Total length 200 cm; greatest width 80 cm; weight 360 kg.

De 87, 1952 or 1953 (or 1955?), Audierne (Finistère). Musée Océanographique de l'Odé, Lestonan.

The mounted specimen is in the museum of Mr. G.-A. Bolloré. The exact date could not be ascertained.

De 88, 11/12.vi.1928, alive, off the coast of Brittany.

Le Rhun (1928: 470): Luth.

Llarena (1928: 463), Navarro Martin (1941: 363): *Dermochelys coriacea*.

Lozano Cabo & Quiroga (1969: 18): *Dermochelis coriacea*.

Le Rhun states that this turtle was taken by Mr. Nonna Hélias, skipper of the "Sans-Gêne" (no. 5424 G.V.), of Saint-Guérolé-Penmarc'h, in drift nets in the night of June 11th/12th, 1928. With the assistance of another vessel the turtle was towed to Guilvinec, where it was sold for 300 francs. It was sent to an exhibition at Brest.

Le Rhun only stated that the turtle was taken off the coast of Brittany, but no exact locality was mentioned. Later authors (Navarro Martin, Lozano Cabo & Quiroga), mention Guilvinec, the port to which it was brought, as the locality.

Carapace, long 135 cm, wide 105 cm; total length 175 cm; width across spread fore flippers 230 cm; weight about 300 kg.

De 89, 1953, Lesconil (Finistère). Station Biologique de Roscoff.

Mr. J.-P. L'Hardy (in litt., 31.iii.1965).

Total length 168 cm.

De 90, 19.v.1896, alive, off Trévignon, Bay of Concarneau (Finistère).

Vaillant (1896: 654), Brongersma (1969: 86, 90, 92, 94), Pritchard (1971: 32): *Dermochelys coriacea*.

J. & H. Bouxin & Legendre (1931: 524): *Dermatochelys coriacea*.

Heldt (1933: 21, 29): *Sphargis coriacea*.

Total length 175 cm; weight 250 kg. Vaillant (l.c.) published some notes on the intestine and food of this specimen; it contained fragments of jellyfish, the Amphipod *Hyperia galba* Montagu, and vegetable matter (*Zostera*, *Ectocarpus*, *Halydryis siliquosa* Lgk., *Cystosira fibrosa* Ag.).

March[and] (1897: 4, note 1) in a note appended to a review of Vaillant's paper, states that the turtle was captured in sardine drift nets, and that it was weighed at the arrival in port; at that time it weighed 262 kg. The next day it was sent to the Muséum National d'Histoire Naturelle, Paris.

Heldt (1933: 21) records some ten specimens of the Trematode *Astrorchis renicapite* (Leidy) that were taken from the alimentary canal of this turtle.

De 91, ca. 1905?, brought to Concarneau (Finistère).

Anonymus (1925c: 114), Legendre (1925: 381): *Sphargis coriacea*.

Aguilar-Amat (1928: 102), Navarro Martin (1941: 363): *Dermochelys coriacea*.

Lozano Cabo & Quiroga (1969: 18): *Dermochelis coriacea*.

In a note describing a Leathery Turtle captured in 1925 (De 94), Anonymus (1925c) and Legendre (1925) mention a specimen that was brought to Concarneau about twenty years ago ("voici une vingtaine d'années", Anonymus; "il y a une vingtaine d'années", Legendre). Anonymus gives the weight as having been 385 kg, and this weight is also mentioned by Navarro Martin; Legendre mentions the weight to have been 380 kg.

This case is not included in their list by J. & H. Bouxin & Legendre (1931).

De 92, 1926, Concarneau (Finistère).

Personal communication by Mr. Alb. Lucas.

De 93, ♀, 21.viii.1947, alive, between Beg Meil and the Ile aux Moutons (Finistère).

Legendre (1947: 335), Brongersma (1969: 86, 90, 96), Pritchard (1971: 32): *Dermochelys coriacea*.

H. Bouxin & Legendre (1947: 464): *Dermatochelys coriacea*.

The turtle had become entangled in lines attached to lobster pots, which it dragged along towards the Ile aux Moutons.

Total length 190 cm; width across the spread fore flippers 225 cm; ovarian eggs 5 mm in diameter.

The anterior part of the intestine contained numerous fragments of the Amphipod *Hyperia galba* (Montagu).

The turtle was accompanied by Pilot Fishes (*Naucrates ductor* (L.)) (Legendre 1947: 336: "*Nauerates ductor*") and Remoras (*Echeneis remora* L. = *Remora remora* (L.)).

De 94, ♀, 8.ix.1925, alive, between the Iles Glénans and the Ile aux Moutons (Finistère).

Anonymus (1925a: 292): dermatochélyde luth.

Anonymus (1925b: 592; 1925c: 113), Legendre (1925: 380), Heldt (1933: 11, 21, 30): *Sphargis coriacea*.

J. & H. Bouxin & Legendre (1931: 524, 525): *Dermatochelys coriacea*.

Aguilar-Amat (1928: 102), Navarro Martin (1941: 363), Brongersma (1969: 86, 95), Pritchard (1971: 32): *Dermochelys coriacea*.

Lozano Cabo & Quiroga (1969: 18): *Dermochelis coriacea*.

Navarro Martin (1941: 363) gives the locality as being Concarneau, but the specimen was taken to Concarneau, where it was dissected.

Total length 193 cm, width 88 cm; the weight originally given as 330 kg was corrected to 380 kg by J. & H. Bouxin & Legendre (1931: 524, table, note 2).

The turtle had become entangled in a line attached to lobster pots. The right hind flipper had been amputated, but the wound had healed, leaving a scar on the stump.

Legendre (1925) dissected this specimen, and he gave some anatomical details. The stomach contained unidentifiable remains and two live parasitic worms. These worms were later identified to be the Trematode *Astrorhynchus renicapite* (Leidy) (J. & H. Bouxin & Legendre, 1931: 528, note 4; Heldt, 1933: 21).

De 95, 18.viii.1930, alive, 1 mile N of the Ile aux Moutons (Finistère).

J. & H. Bouxin & Legendre (1931: 521-523, 524): *Dermatochelys coriacea*.

Heldt (1933: 30): *Sphargis coriacea*.

Total length 180 cm; length of carapace along the median ridge 135 cm, along the first latero-dorsal ridge 138 cm; greatest width 90 cm; weight estimated to be 300 kg.

The turtle was accompanied by Pilot Fishes (*Naucratus ductor* (L.)), which followed when it was towed to the port of Sainte-Marie. Forty Remoras (*Echeneis remora* L.) were also observed, which sometimes swam around, and sometimes were fixed to the lower surface and to the sides of the turtle (J. & H. Bouxin & Legendre, 1931: 526).

It is probably this turtle, which is mentioned by Navarro Martin (1941: 363) from the Ile aux Moutons, and dated 1931, and also that which Lozano Cabo & Quiroga (1969: 17-18) date from 1921.

De 96, 1923, off the coast of Brittany. Musée Océanographique, Monaco.

As Mr. G. Testa (in litt., 2.x.1965) informed me, on November 6th, 1924, the Monaco Museum received from the Paris Museum a stuffed Leathery

Turtle stated to have been captured off the Brittany coast in 1923. Neither of the museums could supply any further information about the locality and date of capture. Notwithstanding this lack of data I insert it in this list among those captured in the central area from which most Brittany specimens have come.

Length 200 cm; weight 400 kg.

De 97, ca. 13.v.1955, brought to Lorient (Morbihan).

Personal communication by Mr. Alb. Lucas.

Total length 200 cm; weight 480 kg.

De 98, vii.1871, alive, Ile de Groix (Morbihan). Skeleton in Muséum National d'Histoire Naturelle, Paris.

"L'Abeille", journal de Lorient, 26.vii.1871 (fide Taslé, 1872).

Taslé (1872: 178, 182), Gervais (1872: 199-200; 1873: 2), J. Ford (1879: 635), Bureau (1894: 228), Legendre (1925: 382), Heldt (1933: 29): *Sphargis coriacea*.

Rosenzweig (1872: 187): tortue de mer.

J. & H. Bouxin & Legendre (1931: 524): *Dermatochelys coriacea*.

Aguilar-Amat (1928: 102), Angel (1946: 181, 184): *Dermochelys coriacea*.

The turtle was captured when it had become entangled in the lines attached to lobster pots (Taslé, 1872: 178).

Taslé (l.c.) states that the turtle was captured in the first days of the second fortnight of July, 1871 ("dans les premiers jours de la seconde quinzaine de juillet"), that it was mentioned in "L'Abeille" on July 26th, 1871, and that it was sent to Paris. The length was said to be about 160 cm, the weight nearly 250 kg.

Prof. J. Anthony kindly informs me (in litt., 9.iii.1965) that the Muséum National d'Histoire Naturelle, Paris, on July 29th, 1871, purchased a Leathery Turtle, stated to have been captured off the coast of Brittany. It was entered in the register under no. 1871-252, and the skeleton, which was extracted from it, received the additional number: A. 8450. I do not believe that there need be any doubt about this turtle being the one from the Isle de Groix, of which Taslé stated that it had been sent to Paris; the date of the news item in "L'Abeille" also fits in very well.

Gervais (1872: 199-200; 1873: 2) states that in May 1872, two Leathery Turtles were captured on the French Atlantic coast ("nos côtes de l'Océan"), and that he obtained one of these. When he received the specimen it was dead several days already, and it was in such a state of decomposition, that it could only be used for a skeleton. It was this skeleton he described. From Prof. Anthony's letter it is clear that the skeleton described by Gervais is the one purchased on July 29th, 1871, and hence it is the turtle from the Ile de

Groix. Thus, the date (May 1872) mentioned by Gervais is erroneous. I do not know the exact date upon which the first paper by Gervais was published, but as he refers to a paper by Cope, published in March 1872, it cannot have been early in that year. Still, it is unlikely that if the specimen he examined had been captured in May, that the paper would have been published in the same year. It would have taken some time to clean the skeleton, to examine and to describe it, to have the plates drawn, and to have the paper printed, and I do not believe that this all could have been done between May and the end of the year.

If we accept that the specimen described by Gervais is that from the Ile de Groix, and that it was taken in July 1871, it seems probable that the second specimen mentioned by Gervais, but which he did not acquire, also is from 1871. Indeed, another Leathery Turtle has been recorded as having been captured in July 1871, viz., the one taken in the La Rochelle roads (De 129). I feel convinced that Gervais erred when he mentioned May 1872 as the date of capture of two Leathery Turtles on the French Atlantic coast, and that in fact he referred to the specimens taken in July 1871. Thus, the two turtles, mentioned by Gervais (1872; 1873), J. Ford (1879: 635), Bureau (1894: 228), Legendre (1925: 382), J. & H. Bouxin & Legendre (1931: 524), and Heldt (1933: 29), as having been captured in 1872, did never exist and these must be struck from the list of French records.

De 99, 3.vi.1932, alive, La Gardenne, Bay of Étrel (Morbihan).

Desbrosses (1932: 274), Balland (1938: 89-90), H. Bouxin & Legendre (1947: 465): *Dermatochelys coriacea*.

Navarro Martin (1941: 363): *Dermochelys coriacea*.

Lozano Cabo & Quiroga (1969: 17): *Dermochelis coriacea*.

Total length 206 cm; length without tail 190 cm; width across spread fore flippers 235 cm; weight 305 kg.

The turtle was taken in drift nets; it was sold at Lorient. Two barnacles, *Conchoderma virgatum* Spengel, were attached to it.

De 100, 19.vii.1960, alive, 3 miles from the coast, off Quiberon (Morbihan).

"La Liberté du Morbihan", 21.vii.1960, 1 phot.; Mr. M. Marsille (in litt., 19.iii.1965).

Weight about 350 kg.

De 101, vii.1954, alive, off Saint-Jacques en Sarzeau (Morbihan).

Bénéat-Chauvel (1955: 98): *Testudo coriacea*.

Weight 500 kg.

De 102, 6/7.vii.1966, dead, Damgan (Morbihan).

Dr. R. Duguy (in litt., 19.vii.1966), Mrs. Baudouin-Bodin (in litt., 1.xii.1966), Mr. Pierre Caron (in litt., 13.xii.1966).

Brongersma (1969: 77), Pritchard (1971: 32): *Dermochelys coriacea*.

The turtle was washed ashore on its back at Damgan in the night of the 6th to the 7th of July, 1966. It had been shot, and bullet wounds were visible on the top of the head.

Total length, 200 cm; carapace, long 150 cm, wide 100 cm; weight 550 kg (Mr. P. Caron, in litt.).

The specimen was emptied of the soft inner parts, the shell, head, and limbs were treated with formalin, and the body cavity was filled with straw. The turtle became the property of the veterinary Mr. Ménager, who put it on exhibition in his private zoo (Zoo de Ludri) at St. Armel (Morbihan). As Mr. Caron informs me, the owner having died, the Zoo with its contents were to be sold at the end of 1966; I do not know who purchased the turtle.

De 103, 1869?, alive, near the mouth of the river Vilaine (Morbihan).

Rozenzweig (1872: 187, tortue de mer) in his presidential address to the Société polymathique du Morbihan refers to the paper submitted by Taslé (1872) dealing with the Leathery Turtle captured near the Ile de Groix in July 1871 (De 98), and he adds that this turtle had been observed already two years earlier near the mouth of the river Vilaine. I believe it hardly possible that the Turtle would have stayed alive in the area for two years and, therefore, I have accepted Rozenzweig's mention of this turtle as a separate record. As yet I have not been able to find another published record for this turtle.

De 104, vi.1956, dead, Ile Dumet (Loire-Atlantique).

Personal communication from Mrs. Baudouin-Bodin; colour transparency A 396 in the Muséum d'Histoire Naturelle, Nantes.

De 105, 1967, dead, Ile Dumet (Loire Atlantique).

Reported to Mrs. Baudouin-Bodin by Mr. & Mrs. Fleury de Valois, of the île Dumet.

De 106, summer 1963, Piriac (Loire-Atlantique).

Mrs. Baudouin-Bodin (in litt., 5.iii.1965).

De 107, towards the end of viii.1838, Bay of Croisic (Loire-Atlantique).

Bourjot (1838: 269): *Sphargis* Luth.

Alessandrini (1838: 357, 360): *Dermatochelydis tuberculata*.

Anonymus (1843: 540): *Sphargis mercurialis*.

Strauch (1865: 134): *Dermatochelys coriacea*,

De 108, ca. 9.ix.1954, Le Croisic (Loire-Atlantique).

Personal communication by Mr. Alb. Lucas.

De 109, 12.viii.1965, alive, Guérande bank, off Le Croisic (Loire-Atlantique).

Mrs. Baudouin-Bodin (in litt., 22.vii.1965); Mr. Alb. Lucas (personal communication).

Length ca. 150 cm ("Ouest France"); weight 320 kg (Mrs. Baudouin-Bodin).

The turtle had become entangled in lines attached to crab pots. It was brought alive to Le Croisic; later it was transferred to the aquarium at Pouliguen, where it died after about two days.

De 110, 4.viii.1729, alive, near the point called "la Pierre percée", 13 "lieues" (ca. 57.8 km) from Nantes on the north side of the Loire estuary (Loire-Atlantique).

De La Font (1731: 8; 1733: 11): tortue extraordinaire.

[Aubert] D[e] L[a] C[henaye] D[es] B[ois] (1759: 395): tortue de mer.

Houttuyn (1764: 16), Statius Müller (1774: 21): *Testudo mydas*.

Fougeroux [de Bondaroy] (1768: 43; 1773: 63): tortue singulière.

Amoureux (1778: 65): tortue.

Chomel (1778: 3286): Zeeschildpad.

Schneider (1783: 43, 313), Latreille (in: Sonnini & Latreille, 1801-1802: 60), De La Cépède (1802b: 150), Wilhelm (1818: 159), Des Moulins (1826 (1830): 184), Griffith & Pidgeon (1830: 94), C[octeau] (1835: 112), Bénéat-Chauvel (1955: 98): *Testudo coriacea*.

De La Cépède (1788a: 114; 1788b: 145; 1799: 46), Lacépède (1802a: 176; 1825: 72; 1836: 36; 1839: 140; 1847: 140; 1856: 152), Daudin (1801-1802: 64): Luth.

Goldsmith (1791: 359; 1804: 26; 1805: 190; 1816: 190): Great Mediterranean Turtle.

Goldsmith (1833: 29; n.d.a: 29; n.d.b, c: 317): Great Mediterranean Turtle (or Coriaceous Turtle).

Goldsmith (1840: 341; 1862: 341): Great Mediterranean Turtle (or Coriaceous Turtle), also called the Leathery Turtle.

Bechstein (1800: 139): lederartige Schildkröte.

Shaw (1802: 78): Coriaceous Turtle.

B[osc] (1804: 254): Tortue franche.

C[loquet] (1817: 383): *Chelonia coriacea*.

Ranzani (1834: 148): [*Testudo*] *coriacea marina*.

Duméril & Bibron (1835: 564), Bonaparte (1837: pt. xix, fol. 94, p. (4)), Storer (1840: 16), Chenu & Desmarest (1856: 40), Agassiz (1857: 373), Cooke (1865: 185; 1893: 184), Frédol (1865: 485; 1866: 541), Taslé (1872: 181, 182), Gervais (1872: 200, note), J. Ford (1879: 633), Bureau (1894: 228), Kosić (1896: 125), Gadow (1901: 334), Legendre (1925: 382), Heldt (1933: 28): *Spargis coriacea*.

Oken (1836: 508): *Sphargis coriacea, mercurialis*.

Bourjot (1838: 269): Sphargis Luth.

Alessandrini (1838: 358): *Dermochelydis tuberculata*.

Anonymus (1841: 39): *Testudo midas*.

Lacépède (1836: 36), Anonymus (1843: 540): *Sphargis mercurialis*.

Strauch (1865: 134), Brehm (1878: 90), Sears (1887: 89), J. & H. Bouxin & Legendre (1931: 523, 524), Brascassat (1931: 28): *Dermatochelys coriacea*.

G[ervais] (1869: 728): *Sphargis*.

Boettger & Pechuel-Loesche (1892: 552), Werner (1912, 1920: 467), Aguilar-Amat (1928: 102), Navarro Martin (1941: 363), Angel (1946: 181): *Dermochelys coriacea*.

Lozano Cabo & Quiroga (1969: 17): *Dermochelis coriacea*.

The municipal archives of Nantes contain copies of two letters referring to this turtle. They were written by Gérard Mellier (sometimes spelled Meslier, according to Larousse, 1874: 988), who from 1720 until his death in 1729 was mayor of Nantes. The letters were addressed to "Mgr. le Maréchal, Duc d'Estrées", i.e., to Louis Charles César Le Tellier, Duc d'Estrées, Marquis de Courtanvaux, Maréchal de France, Governor of Nantes (born 4.v.1697, died 1771; Hoefler, 1856, columns 581-582).

In the first letter, dated August 8th, 1729, Mellier wrote:

"Quelques Pescheurs ont pris à l'entrée de notre Rivière un Poisson monstrueux qu'ils ont amené dans cette ville depuis deux jours. Il est de la longueur environ huit pieds & de la grosseur d'un muid de vin. Nos habitants ont été le voir avec empressement n'en aiant jamais été vu de semblable à Nantes. Nos marins disent que c'est une tortue. Mr. Bouvin fameux chirurgien-anatomiste l'a visité de près: Il est de même sentiment, & j'en ai trouvé la figure à la page 184 de Rondelet commenté par Boussuet, de l'Edition de Lion en 1558. Je fais actuellement dessiner ce poisson sur l'original."

In the second letter, dated October 6th, 1729, it is stated:

"J'ai l'honneur de vous envoyer le Dessin que j'ai fait graver avec ses dimensions d'un Poisson monstrueux de 7 pieds de long, pesché à l'embouchure de notre rivière au mois d'aoust dernier & amené en cette ville, ou l'on n'en a jamais vu de pareil. Nos marins assurent, Mgr., que ce Poisson n'étant pas inconnue à la Chine, il y a toute apparence qu'il a suivi le vaisseau le Jason appartenant à la Compagnie des Indes qui arriva au mois de juillet dernier au Port de Lorient venant de la Chine."

The suggestion by seamen from Nantes that the species was not unknown in China and that, therefore, it was highly probable that the turtle would have followed the ship "Jason" of the East India Company from China to the port of Lorient in Brittany, was also mentioned by De la Font (1731, 1733), who spelled the name of the port "L'Orient". Fougeroux (1768: 43; 1773: 63) when dealing with De III mentions the opinion of Delafont (De la Font), and he adds that it would be interesting to know what could have attracted these two turtles (De IIO, De III) to come from such a long distance to the same area on the coast of Brittany. He further states that it would be difficult to guess the cause, at least if one would not suppose that the turtles had followed ships coming from China.

De la Font (1731, 1733) gives the length of the turtle as having been "7 pieds 1 pouce" (ca. 230 cm, or 7 ft. 6½ in.), width "3 pieds 7 pouces" (ca. 116.5 cm, or 3 ft. 9½ in.).

From Mellier's letters it is clear that an engraving was made, and one can only hope that a print of this will turn up one day. Fougeroux (1768: 43; 1773: 63) considers it highly likely that the turtle had been preserved and that it is the specimen, which formed part of the cabinet of S.A.S. Mgr. le Prince de Condé at Chantilly. This must have been Louis Henri, Duc de Bourbon, eighth Prince de Condé (born Versailles 18.viii.1692, died Chantilly 27.i.1740). Having fallen into disgrace he retired to Chantilly, where he occupied himself with chemistry and natural history (Prevost, 1954: column 1409-1410; Amat, 1961: col. 436).

The turtle was captured at "la Pierre percée" at thirteen "lieues" (leagues) from Nantes. Mr. L. Rouzeau, of the archives of the Département de la Loire-Atlantique, kindly informed me that "la Pierre percée" is a rock standing in the sea, opposite Bonne Source (near Pornichet) at the mouth of the Loire estuary. In literature errors have been made in the distance from Nantes; Fougeroux (1768: 43; 1773: 63) and Shaw (1802: 78) mention the distance to have been three leagues. Errors have also been made with regard to the year of capture, e.g., Latreille (in: Sonnini & Latreille, 1801-1802: 60): 1725; Fré dol (1865: 485; 1866: 541): 1726; Des Moulins (1826 (1830): 184): 1772.

The reference by Lennier (1904: 215, La Sphargis) probably was also based upon this record.

De 111, ♀, 10.vii.1765, alive, off Le Pornic (Loire-Atlantique).

Fougeroux [de Bondaroy] (1768: 42; 1773: 61): tortue singulière.

Schneider (1783: 314), Wilhelm (1818: 159): *Testudo coriacea*.

Ranzani (1834: 149): [*Testudo*] *coriacea marina*.

Oken (1836: 508): *Sphargis coriacea, mercurialis*.

Schlegel (1838: 11): *Sphargis [mercurialis]*.

Alessandrini (1838: 359): *Dermatochelydis tuberculata*.

Anonymus (1843: 540): *Sphargis mercurialis*.

Strauch (1865: 134), J. & H. Bouxin & Legendre (1931: 524), H. Bouxin & Legendre (1947: 465): *Dermatochelys coriacea*.

Gervais (1872: 200, note), Taslé (1872: 181, 182), Bureau (1894: 228), Legendre (1925: 382), Heldt (1933: 29): *Sphargis coriacea*.

Aguilar-Amat (1928: 102), Navarro Martin (1941: 363), Angel (1946: 181), Legendre (1947: 336): *Dermochelys coriacea*.

The turtle was harpooned off the Brittany coast, near Le Pornic; it lived for forty-eight hours after it had been taken from the water. Eventually the turtle was taken to Nantes. The capture was reported to Fougeroux by Bonvoux; the specimen was sent to Paris.

The specimen was said to have weighed about a thousand pounds. It contained an enormous number of eggs; some of these were as large as oranges, others were smaller (Fougeroux, 1768, 1773).

Some authors (e.g., Schlegel, 1838: 11, and Gervais, 1872: 200, note) mention only Brittany as the locality where the turtle was captured, other authors refer to Le Pornic as the locality. Schlegel (1838: 11) places the event in 1760. Alessandrini (1838: 359) apparently confused Brittany and Britain, and he believed that the specimen taken off Brittany in 1765 was the same as one of those taken off Cornwall in 1756; Anonymus (1843: 540) who reviewed Alessandrini's paper pointed out this error.

De 111a, 8.vi.1765, alive, Bourgneuf (Loire-Atlantique).

A description of this Leathery Turtle is to be found among the documents of the 'Chambre de Commerce de Nantes', which are present in the archives of the Département de la Loire-Atlantique, at Nantes. The description is signed by an initial, which I cannot decipher, and there is no further indication as to the author. As it has not been published before, the complete text will be given here:

„Description d'une Tortuë de mer pêchée
à Bourgneuf le 8 Juin 1765.

Nantes le 12 Juin 1765.

On montre actuellement en cette Ville, et comme une grande curiosité, une Tortuë de mer bien différente de celles que l'on pêche à l'Amérique. En voici la description fort exacte. Elle a 7 pieds de long depuis la Superficie de la machoire inférieure jusqu'au bout de la queue; trois pieds dans la plus grande largeur, 18 pouces d'épaisseur, et elle puit peser entre 8 à 900 livres.

C'est animal est d'un brun noirâtre, le ventre plat, fort lisse et marqueté de blanc et de Noir. Son Ecaille qui a un pouce et demi d'épaisseur, et un peu moins de cinq pieds de long, se termine en pointe au dessus de la queue. Cette écaille n'est point si convexe que celle des Tortuës de l'Amérique: Elle est divisée en Sept rayons, ou compartimens. Celui de l'épine du dos ressemble à la raye d'un Mullet, les autres, dont trois de chaque côté, sont comme des côtes de Melon, Sur lesquels il y a des nodus à quatre doigts de distance les uns des autres. On soupçonne que cette Ecaille n'est point Solide partout, quoi qu'elle Soit fort dure et résiste au couteau, mais qu'il peut y avoir des os qui règnent le long des rayons: c'est ce que la dissection de cet animal pourra apprendre.

Quoi qu'il en Soit, Sa tête est faite exactement comme celle d'une loutre d'environ un pied de long; le col est un peu moins gros, il a huit pouces d'épaisseur et fort rond, d'ou pend une espèce de besace ou poche de 4 pouces de long. La gueulle paroît avoir 8 à 9 pouces de large, la machoire inférieure Se termine en pointe, et S'emboite dans la Supérieure comme un davier de dentiste. La langue est adhérente à la machoire inférieure. Au lieu de dents il y a des carthilages

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assez dures; les yeux ronds, de la largeur d'un Louis et à fleur de tête.

Cette tortue a Les nageoires en forme d'ailes de pigeons. Les deux principales prennent naissance à 6 pouces de chaque côté du Col: Elles ont trois pieds de long,

6 pouces d'épaisseur et 10 dans la plus grande largeur; les deux autres à 6 pouces avant la pointe de Son écaille, ont deux pieds de long, 4 pouces d'épaisseur et 7 de large. Sa queue faite comme celle d'un Castor a 1 pied de long et 5 à 6 pouces d'épaisseur. Toutes ces parties Sont charnues, couvertes d'une peau fort douce et semblable à du Maroquin.

Quoique cette Sorte de Tortuë paroisse for rare sur nos côtes, cependant quelques personnes Se ressouviennent d'en avoir vu une pareille il y a environ 20 ans en cette ville, de 17 pieds de long et qui pouvoit peser 2000 L. Il eut été à Souhaiter pour la curiosité publique que l'on eut pû conserver cet animal en vie, comme il eut été très facile de le faire avec de l'eau salée, mais les pêcheurs qui le prirent le 8 de ce mois auprès de Bourgneuf lui donnerent un Si grand coup d'aviron Sur la tête qu'il en mourut hier au matin.

J'oubliois d'observer que par la construction de cette Tortue, il ne paroît pas quelle pût retirer Sous Son Ecaille Sa tête, ses nageoires et Sa queue, comme le font celles de l'amérique."

It seems highly likely that De 111 and De 111a are based upon one and the same Leathery Turtle, notwithstanding the fact that different localities and different dates are mentioned. Although two or more Leathery Turtles may be present in a limited area, it seems rather unlikely that Bonvoux who reported the capture of De 111 to Fougeroux de Bondaroy, would have omitted reference to De 111a, which according to the dates was taken a month earlier. For De 111 the locality La Pornic was mentioned, and for De 111a Bourgneuf. Le Pornic is situated on the shores of the Baie de Bourgneuf, and it seems likely that the Bourgneuf of the description refers to the bay rather than to the village of Bourgneuf. Of both specimens it is stated that they were taken to Nantes. De 111 is stated to have died after 48 hours. De 111a died on June 11th, and this is probably two days after it reached Nantes. Of both it is stated that the carapace was "un pouce et demi" thick.

One wonders whether the inhabitants of Nantes, mentioned in the contemporary description of De 111a, and who remembered having seen a similar turtle about twenty years before, did err in the date and that in fact they remembered the Leathery Turtle of 1729 (De 110). However this may be, I have not included a separate record for a turtle seen in 1745. The description of De 111a became known to me after the bulk of the manuscript was completed and after the tables had been prepared. Therefore this record has not been included in the numbers of specimens in the tables.

De 112, viii?1767, alive, Bay of Bourgneuf (Loire-Atlantique and Vendée).

Viaud-Grand-Marais (1895: li): *Sphargis luth*.

Baudouin (1909: 501): tortue gigantesque.

Anonymus (1925c: 114): *Sphargis coriacea*.

Navarro Martin (1941: 363): *Dermochelys coriacea*.

Lozano Cabo & Quiroga (1969: 17): *Dermochelis coriacea*.

Viaud-Grand-Marais (1895: li) quotes from a letter which his maternal

great-great-grandfather wrote on August 22nd, 1767, to his maternal great-grandfather, in reply to a letter from the last-named, of August 14th, 1767. In this letter a gigantic turtle is mentioned to have been captured in the Bay of Bourgneuf. Viaud-Grand-Maraïs states that the record had not been mentioned in any scientific publication, unless it was based upon the turtle mentioned by Gervais (i.e., Gervais, 1872: 200, note) as having been captured on the coast of Brittany on July 10th, 1765. The turtle referred to by Gervais was taken at Le Pornic (De 111), which is situated on the north-east shore of the Bay of Bourgneuf. However, as Viaud-Grand-Maraïs points out, it is unlikely that his ancestors would correspond in August 1767 about a turtle captured two years earlier. I have accepted this case as a separate record.

The turtle is also mentioned by Baudouin (1909: 501), who mentions its having been captured at Noirmoutier, on the south-west side of the Bay of Bourgneuf. Anonymus (1925c: 114) again mentions the turtle from the Bay of Bourgneuf. This anonymous writer must have been Baudouin, because he refers to Baudouin's paper of 1909 as 'my memoir'.

De 113, viii.1913, St. Gilles sur Vie (Vendée).

Anonymus (1925c: 114), Heldt (1933: 30): *Sphargis coriacea*.
J. & H. Bouxin & Legendre (1931: 524): *Dermatochelys coriacea*.
Navarro Martin (1941: 363): *Dermochelys coriacea*.
Lozano Cabo & Quiroga (1969: 17): *Dermochelis coriacea*.

Length, 170 cm.

De 114, 12.vii.1965, dead, Saint-Gilles-Croix-de-Vie (Vendée).

Mrs. Baudouin-Bodin (in litt., 22.vii.1965).

Weight, 300 kg.

De 115, 27.ix.1919, alive, off Sables-d'Olonne (Vendée).

"Phare de la Loire", 1.x.1919 (not seen).
Durand (1932: 78): *Sphargis coriacea*.
Duguy (1968: 9): *Dermochelys coriacea*.

Weight about 400 kg.

De 116, ix.1921, alive, off Sables-d'Olonne (Vendée).

Durand (1932: 78): *Sphargis coriacea*.
Duguy (1968: 9): *Dermochelys coriacea*.

Stated by Durand to have been smaller than De 115.

De 117, 19.x.1953, alive, off Sables-d'Olonne (Vendée). Muséum d'Histoire Naturelle, Nantes.

Mrs. Baudouin-Bodin (in litt., 5.iii. 1965).

Length, 160 cm; weight, 310 kg.

De 118, viii.1958, alive, off Sables-d'Olonne (Vendée). Musée de la Mer, Biarritz.

Dr. L. Barrietty (in litt., 26.ii.1965).

De 119a-1, 7.ix.1963, alive, SW of Sables-d'Olonne (Vendée).

Duguy (1968: 10): *Dermochelys coriacea*.

In his notes on the occurrence of the Leathery Turtle off the coasts of Charente-Maritime, Duguy (1968: 10) refers to a most interesting observation by Mr. J. C. Menu. On September 7th, 1963, at about 6.30 p.m., Mr. Menu observed a dozen Leathery Turtles, in groups of three or four, separated by a distance of about one hundred metres, a single one was on its own. Mr. Menu added that Leathery Turtles were observed in the area each year in September sometimes alone, sometimes two or three together.

De 120, 27.x.1965, dead, Tranchet beach, Sables-d'Olonne (Vendée).

"Presse-Océan", 29.x.1965, 1 fig.

Duguy (1968: 10), Brongersma (1969: 77), Pritchard (1971, p. 32): *Dermochelys coriacea*.

Weight, about 200 kg. According to "Presse-Océan" the carapace showed long and deep cuts caused by a ship's propeller.

De 121, 1957, alive, Pertuis Breton, off La Tranche-sur-Mer.

Duguy (1968: 10): *Dermochelys coriacea*.

Weight, estimated at 480 kg.

Two Remoras (*Echeneis remora* = *Remora remora* (L.)) were attached to the turtle. The skull and a photograph of this Leathery Turtle are in the Museum at Saint-Clément-des-Baleines, île de Ré.

De 122, 10.vii.1961, alive, La Tranche-sur-Mer (Vendée).

Dr. R. Duguy (in litt., 19.vii.1966).

This turtle was found drowned in nets off La Tranche. It has been included among the live turtles, because it must have been alive when it became entangled in the nets. No measurements are given, but it is stated to have been a large adult specimen. It has not been preserved.

De 123, ♂, 30.vi.1966, alive, Pertuis Breton, about 3 miles off La Tranche-sur-Mer (Vendée). Musées d'Histoire Naturelle, La Rochelle, No. 488R.

Duguy (1968: 10, fig. 3), Brongersma (1968d, pl. I fig. 1; 1969: 86, 92): *Dermochelys coriacea*.

The turtle was in the act of swallowing a jellyfish when it was caught in a net by Mr. Renaud, who took the turtle to L'Aiguillon-sur-Mer (Vendée).

During its further transport from L'Aiguillon to La Rochelle the turtle died.

Total length (straight line), 232 cm; length of skull, 27 cm; length of carapace, 154 cm; width of carapace 90 cm; length of plastron, 124 cm; fore flipper, long 100 cm, wide 25 cm; hind flipper, long 50 cm, wide 43 cm.

The mounted specimen has been preserved in the Musées d'Histoire Naturelle, La Rochelle.

De 124, 1754, alive, Pertuis d'Antioche, at the level of the island of Ré (Charente-Maritime).

"Affiches de Paris", 24.viii.1754 (not seen).

[Aubert] D[e] L[a] C[henaye] D[es] B[o]is (1759: 396): tortue de mer.

Valmont de Bomare (1770: 334; 1771: 49; 1775a: 226; 1775b: 54; 1776: 49), Valmont-Bomare (1800: 265): Caret.

Houttuyn (1764: 18), Statius Müller (1774: 21-22), [Borowski] (1783: 15), De La Cépède (1802b: 122; 1833: 347): *Testudo mydas*.

Chomel (1778: 3286): Zeeschildpad.

Schneider (1783: 46): no identification.

De La Cépède (1788a: 89; 1788b: 116-117; 1799: 37), Daudin (1801-1802: 14), Lacépède (1802a: 151; 1825: 62; 1836: 30; 1839: 134; 1856: 146), Landrin (1867: 113), Bénéat-Chauvel (1955: 98): Tortue franche.

Cornide (1788: 116): Tortuga.

Goldsmith (1791: 360; 1804: 27; 1805: 191; 1816: 191): Great Mediterranean Turtle.

Goldsmith (1833: 30; n.d.a: 30; n.d.b, c: 317): Great Mediterranean Turtle (or Coriaceous Turtle).

Goldsmith (1840: 341; 1862: 342): Great Mediterranean Turtle (or Coriaceous Turtle), also called the Leathery Turtle.

Bechstein (1800: 104), Anonymus (ca. 1832a: 59): Riesenschildkröte.

Shaw (1802: 84): in article on Green Turtle, but suggested it was a Loggerhead.

Wilhelm (1818: 138): *Testudo marina*.

Voigt (1837: 85): *Chelonia mydas*.

Frédol (1865: 484; 1866: 540), Hart (1869, 1882: 359): *Chelonia midas*.

Heldt (1933: 29): *Sphargis coriacea*.

Duguy (1968: 8), Brongersma (1969: 79), Pritchard (1971: 32): *Dermochelys coriacea*.

Total length "huit pieds et quelques pouces"; according to Valmont de Bomare (1770: 334) "acht voeten vier duimen", and (1771: 49; 1775a: 226; 1775b: 54; 1776: 49): "huit pieds quatre pouces" (ca. 271 cm); length of carapace "cinq pieds" (162.5 cm), but when dried it had shrunk "deux pouces" (5.4 cm); weight between 700 and 800 "livres" (ca. 317-363 kg) according to Aubert de la Chenaye des Bois, over 800 "livres" (over 363 kg) according to Valmont de Bomare.

Those of the authors, mentioned above, that made an identification considered this turtle to be a Green Turtle (tortue franche, Riesenschildkröte, *Chelonia mydas*), the only exception being Valmont de Bomare, who used the name "caret", and Shaw, who suggested that it might have been a Loggerhead. The measurements definitely point to this turtle being *Dermochelys coriacea*.

The turtle was taken alive to Lanvaux Abbey near Vannes ("Louvaux", Aubert de la Chenaye des Bois; "Lonvaux", Valmont de Bomare; "Longveau", La Cépède; "Lombaux", Cornide; "Lonvana", Landrin); there it was slaughtered, and in all a hundred people ate of it; the liver alone was sufficient for four meals of the clergy.

Probably, the fact that the turtle was eaten, led to the conclusion that it had been a Green Turtle. Although it is usually said that the Leathery Turtle is of no use as food, there are statements to the contrary. I know that it is used as food in Western New Guinea. Deraniyagala (1930: 52, note 2) mentions having eaten an excellent curry made of *Dermochelys* meat, and Ray & Coates (1958: 221) praise *Dermochelys* steak. Therefore, the fact that the monks of Lanvaux Abbey apparently enjoyed their turtle meal, can hardly be used as evidence that it could be nothing else but a Green Turtle. Also the statement that the shell, when dried, had shrunk "deux pouces" (5.4 cm) is more easily explained if it was the shell of a Leathery Turtle, than if it was the more solid carapace of a Green Turtle.

Connected to this record is a rather amusing hypothesis as to its origin, mentioned by Valmont de Bomare (1771: 50; 1775a: 226; 1775b: 55; 1776: 50; Valmont-Bomare, 1800: 265-266, note a), De La Cépède (1788a: 88, note k; 1788b: 115, note k; 1799: 36, note k), Cornide (1788: 116), Bechstein (1800: 103, note o), Wilhelm (1818: 139-140), and others. In 1771 Valmont de Bomare received a letter from Mr. Laborie Jr., who wrote that his father, when returning from San Domingo in 1741 or 1742, had taken a small live turtle of between 20 and 25 "livres" (about 9 to 11 kg) with him, with the intention to eat it during the voyage to France. The turtle did very well on the scraps it was fed with, and it grew so quickly, that Mr. Laborie Sr. decided to postpone his meal until after he had landed at Bordeaux. As the ship had freight for La Rochelle, it entered the Pertuis d'Antioche, where it came into a storm with high seas. The captain decided to take shelter in the river Morbien, but due to a mistake of the pilot the ship was wrecked, and (presumably) the turtle escaped. When in 1754 Mr. Laborie Sr. heard about a turtle having been captured in the same area, he was convinced that this was the turtle that he had lost in the shipwreck. Mr. Laborie Jr. also was convinced of this, and he concluded that it was proven that turtles could survive and thrive in French Atlantic waters for years. Therefore, he suggested that turtles should be brought to France and liberated, to start turtle fisheries in due time. Cornide (1788: 118-119) expressed the opinion that Spanish waters would be even better suited to let the turtles grow up, and he also suggested that turtles should be imported and liberated; in this way a new and palatable food would be obtained to bring some change into meals during Lent.

As the turtle taken in 1754 definitely was a Leathery Turtle, we may safely assume that this was not the turtle brought to France by Mr. Laborie Sr.; the turtle which was included in Mr. Laborie's provisions will have been a young Green Turtle.

De 125, middle of ix.1964, alive, off the Pointe du Lijay, île de Ré (Charente-Maritime).

Dr. L. Barrietty (in litt., 26.ii.1965); Mrs. Baudouin-Bodin (in litt., 5.iii.1965); Mr. B. Callame (in litt., 26.iv.1965); Marine Marchande (in litt., 16.vii.1965).

Of this turtle a photograph was sent to the Leiden Museum by the Mayor of St. Martin-de-Ré. The specimen was stated to have been about 250 kg (Marine Marchande).

Mr. C. Cazaux (in litt., 12.iii.1965) mentions a Leathery Turtle that was captured in nets on the coast of the île de Ré, and which was offered to (but not purchased by) the Institut de Biologie Marine, Arcachon, in November 1964.

Inquiries in the île de Ré by Dr. R. Duguy (in litt., 1.v.1968) make it likely that all the reports cited above refer to one and the same specimen.

De 126, 28.viii.1967, alive, Karola, NW coast of the île de Ré (Charente-Maritime).

Dr. R. Duguy (in litt., 1.ix.1967; 1968: 10): *Dermochelys coriacea*.

The turtle became entangled in the lines attached to lobster pots; it was taken by Mr. Girardeau, skipper of the "Poisson d'Avril", who had it transported to La Rochelle, where it was placed in a basin in the laboratory of the Centre de Recherches et d'Études océanographiques. From there it was taken to the Zoo of La Palmyre, where it died on August 30th, 1967. Just as in similar instances the turtle wounded itself by swimming against the walls of the basin. The stuffed specimen is preserved at La Palmyre.

Total length 220 cm; length of carapace (along curve) 170 cm.

De 127, 27.viii.1951, Sablanceaux, île de Ré (Charente-Maritime).

Marine Marchande (in litt., 16.vii.1965).

Duguy (1968: 10): *Dermochelys coriacea*.

The specimen was stranded on the beach of Sablanceaux, and this makes it likely that it was dead.

The carapace and some photographs are in the Museum at St. Clément-des-Baleines, île de Ré.

De 128, date?, île De Ré (Charente-Maritime).

Marine Marchande (in litt., 16.vii.1965).

The carapace is in the Museum at St. Clément-des-Baleines, île de Ré.

De 129, in the first days of vii, 1871, alive, La Rochelle Roads (Charente-Maritime); Musées d'Histoire Naturelle, La Rochelle, no. 576R.

Vivier (1874: 8), Sauv  (1874: 114): *Sphargis luth.*

Beltr mieux (1884: 471), Bureau (1894: 228), Heldt (1933: 29): *Sphargis coriacea*.

Bertin (1925: 232, fig. 1), Navarro Martin (1941: 363), Duguy (1968: 8): *Dermochelys coriacea*.

Balland (1938: 90), J. & H. Bouxin & Legendre (1931: 524): *Dermatochelys coriacea*.

Lozano Cabo & Quiroga (1969: 17): *Dermochelis coriacea*.

Total length 220 cm.

As has been mentioned above (De 98) apparently this specimen is one of the two, which Gervais (1872: 199; 1873: 2, *Sphargis coriacea*), and several authors after him, stated to have been taken on the French Atlantic coast in May 1872.

De 130, summer of 1955, dead, brought to La Rochelle (Charente-Maritime).

Mr. B. Callame (in litt., 26.iv.1965).

Brongersma (1969: 77): *Dermochelys coriacea*.

The head was damaged by a ship's propeller.

De 131, before 29.vi, about 1928, alive, off the west coast of the  le d'Oleron (Charente-Maritime).

Mr. P. Enard (in litt., 17.ix.1938).

Duguy (1968: 9): *Dermochelys coriacea*.

In his letter Mr. Enard states that about ten years ago ("Il y a une dizaine d'ann es") Mr. Gustave Mass , skipper of the sloop "La D sir e", of La Cotini re, captured a large Leathery Turtle. It was kept alive for some days, and it was exhibited on the day of the patron of St. Pierre-d'Oleron (June 29th). After it died the entrails were removed, it was preserved with formalin, and Mr. Toyeau put it on show in a small museum at St. Pierre-d'Oleron.

De 132, 3.ix.1936, alive, off La Cotini re,  le d'Oleron (Charente-Maritime).

Balland (1938: 90): *Dermatochelys coriacea*.

Duguy (1968: 9): *Dermochelys coriacea*.

Dr. L. Barri ty (in litt., 26.iii.1965).

Mr. P. Enard (in litt., 17.ix.1938) mentions a large turtle, of more than 200 kg, which was captured in fishing nets by Mr. Isma l Fonteneau, skipper of the sloop "Le Rondib t", of La Cotini re, in June 1936. The live turtle was purchased by the Mus e de la Mer, Biarritz, but it died a few

days after its arrival; a cast (no. 66.08.17) is still preserved at Biarritz. A photograph of this Leathery Turtle is in the possession of the Musées d'Histoire Naturelle, La Rochelle.

Balland (1938: 90), Duguy (1968: 9), and Dr. L. Barrietty (in litt., 26.iii.1965) mention September 3rd, 1936, as the date upon which the turtle was captured; Enard (in litt., 17.ix.1938) places the event in June 1936. Although, in his letter Mr. Enard states definitely that turtles were observed in the area only from June to August, it seems that with regard to the turtle mentioned here the date mentioned by him was erroneous.

De 133, vii.1937, alive, off the île d'Oleron (Charente-Maritime).

Enard (in litt., 17.ix.1938).

Duguy (1968: 9): *Dermochelys coriacea*.

This turtle was found dead at sea by a fisherman from La Cotinière; it is stated that the turtle had died from the wounds it had received during an attempt to capture it, and hence it is included by me among the turtles that arrived in the area alive. For several days it remained tied to a buoy, but on account of its state of decomposition it was buried.

De 134, ♀, 17.vi.1938, alive, off the île d'Oleron (Charente-Maritime).

Enard (in litt., 17.ix.1938).

Duguy (1968: 9): *Dermochelys coriacea*.

The turtle was taken by Mr. Ismaël Fonteneau, skipper of the sloop "La Rondibet". It was shown at the fair at Chateau-d'Oleron. This female contained a long string of eggs of various sizes.

Total length 200 cm; weight close on 300 kg.

De 135-136, 14.vii.1938, alive, off the île d'Oleron (Charente-Maritime).

Enard (in litt., 17.ix.1938).

Duguy (1968: 9): *Dermochelys coriacea*.

The crew of the sloop "Azur des Flots", from La Cotinière, sighted these two turtles, which disappeared when the sloop came closer.

De 137, 25.vii.1966, alive, 3 miles from La Cotinière, île d'Oleron (Charente-Maritime).

Duguy (1968: 10): *Dermochelys coriacea*.

"Sud-Ouest", 25.vii.1969.

The turtle had become entangled in the lines attached to lobster pots; it was captured by Mr. Ricon, skipper of "L'Aventurière". It was towed to the port

of La Cotinière, where it was moored to a cable in the floating dock, but after a few days it escaped.

De 138, 23.vii.1969, alive, 2 miles off Vert Bois (i.e., 3 miles from La Cotinière), île d'Oleron (Charente Maritime).

Marine Marchande, Affaires Maritimes, Quartier d'Oleron (in litt. 4.ix.1969); Dr. R. Duguy (in litt., 8.ix.1969).

"Sud-Ouest", 25.vii.1969, fig.; "Le Dauphiné", 25th year, no. 7655, 24.vii.1969.

The turtle was captured in the nets of the trawler "Alliance Familiale", skipper Guy Massé; it was towed to La Cotinière, but on July 26th, 1969, at 10 a.m. it was released.

Total length 185 cm; width across the spread fore flippers, 198 cm; width of carapace 96 cm. According to "Sud-Ouest" its length was 2 metres, and its weight 300 kg.

De 139, 24.viii.1938, alive, off La Coubre, île d'Oleron (Charente-Maritime).

Enard (in litt., 17.ix.1938).

Duguy (1968: 10): *Dermochelys coriacea*.

The turtle was sighted by Mr. Page, skipper of the sloop "Mon Caprice", of La Cotinière; the turtle disappeared when the sloop drew near.

De 140, 9.vi.1826, alive, between the Tour de Cordouan (Gironde) and the Pointe de la Coubre (Charente-Maritime).

Des Moulins (1826 (1830): 184): *Testudo coriacea*.

Ranzani (1834: 149): [*Testudo*] *coriacea marina*.

Alessandrini (1838: 359): *Dermochelydis tuberculata*.

Anonymus (1843: 540): *Sphargis mercurialis*.

Strauch (1865: 134): *Dermatochelys coriacea*.

Lataste (1876: 224): *Sphargis coriacea*.

Duguy (1968: 9): *Dermochelys coriacea*.

The turtle was harpooned; it died when brought on land.

Total length 228 cm; length of carapace 148 cm.

De 141, ♀, 2.viii.1938, alive, off Saint-Seurin-d'Uzet and Mortagne (Charente-Maritime), Gironde estuary, 20-30 km from sea.

Balland (1938: 86): *Dermatochelys coriacea*.

Duguy (1968: 9): *Dermochelys coriacea*.

Clippings from two newspapers in the archives of the Musées d'Histoire Naturelle, La Rochelle, show photographs of this turtle. The caption of one of them states that the turtle was captured by Mr. Georges Mossant, of Port-Maubert, whilst fishing for sturgeon. The turtle was towed to Royan

on August 3rd; two days later it was placed in a large basin with sea water; on August 8th it died, having wounded itself on the walls of the basin. The turtle was preserved in the Museum of Royan, but in January 1945, during the second world war, most of the town (including the museum) was destroyed (personal communication by M. le Secrétaire Général du Tourisme, Royan; Duguy, 1968: 10).

Total length 187 cm; length of the median ridge of the carapace, 158 cm; width of carapace, 87.5 cm; width across the spread fore flippers, 220 cm; head, long 32 cm, wide 26 cm; tail, long 27 cm, reaching 4.5 cm beyond carapace; length of fore flipper 102 cm; length of hind flipper 62 cm; weight approximately 400 kg.

De 142, 7.ii.1904, alive, opposite Blaye, Gironde estuary, 90 km from sea (Gironde).

Pellegrin (1904: 321-322), Navarro Martin (1941: 363), Duguy (1968: 9): *Dermochelys coriacea*.

Anonymus (1925c: 114): *Sphargis coriacea*.

J. & H. Bouxin & Legendre (1931: 524), Balland (1938: 90): *Dermatochelys coriacea*.

Lozano Cabo & Quiroga (1969: 17): *Dermochelis coriacea*.

Total length 205 cm; weight about 500 kg.

De 143, 22.x.1922, alive, 15 miles from the coast, at equal distances from Biarritz (Basses-Pyrénées) and Cap Breton (Landes) (15 miles off the mouth of the river Adour). Muséum National d'Histoire Naturelle, Paris.

Angel (1923: 481; 1946: 181), Navarro Martin (1941: 363), Pritchard (1971: 32): *Dermochelis coriacea*.

Roule (1925: 411): Tortue Luth.

Balland (1938: 90): *Dermochelys coriacea*.

Lozano Cabo & Quiroga (1969: 17): *Dermochelis coriacea*.

Total length 235 cm; length of carapace 150 cm, width 90 cm; weight about 450 kg. Two Remoras (*Echeneis remora*) were attached to the turtle.

Angel (1946: 181) remarkably enough mentions Bayonne as the locality.

De 144, 22.vii.1930, alive, St. Jean-de-Luz (Basses Pyrénées), Muséum d'Histoire Naturelle, Bayonne.

Balland (1938: 90): *Dermatochelys coriacea*.

De 145, 6/7.xii.1930, alive, off St. Jean-de-Luz (Basses Pyrénées).

Brascassat (1931: 28-29), Balland (1938: 90), H. Bouxin & Legendre (1947: 465): *Dermatochelys coriacea*.

Heldt (1933: 30): *Sphargis coriacea*.

Length nearly 200 cm; weight estimated to have between 480 and 500 kg.

De 146, ?

G[ervais] (1869: 728) mentions a Leathery Turtle in the museum at Orléans, which is said to have been harpooned off the French coast. I have not been able to find any more exact data on this specimen.

Gervais (1872: 199; 1873: 2) refers to two specimens taken on the French Atlantic coast in May 1872, but as shown above (De 98) this is an error.

SPAIN

De 147, 30.x.1947, alive, captured by fishermen from Motrico, at some six hours sailing from San Sebastián in the direction of the French coast.

Navaz & De Llarena (1951: 3, 9-12, figs. 1-8), Brongersma (1969: 86, 88, 93), Pritchard (1971: 32): *Dermochelys coriacea*.

Total length 165 cm; length of median ridge of carapace 128 cm; length of paramedian ridge 109 cm; width of carapace 92 cm; depth of body 35 cm; width across spread fore flippers 195 cm; length of fore flipper 82 cm; length of hind flipper 30 cm; tail, long 16 cm, extending beyond carapace 4 cm.

Between the papillae of the oesophagus the half digested and decomposed body of a young *Trachurus trachurus* (L.) was found (Navaz & De Llarena, 1951: 7, 12). The stomach was empty, but the intestine contained a viscous liquid producing a nauseating odour. The suggestion that the young *Trachurus trachurus* formed part of the turtle's food seems not to be fully warranted. One wonders whether any appreciable digestion takes place between the horny papillae of the oesophagus, and it seems more likely that the partly digested fish was swallowed such as it was, and that it may have been the food of a jellyfish together with which it was ingested.

De 147 bis, 9.xi.1969, beach of Mioño (Prov. Santander).

Cendrero & Madariaga (1970: 115-116, fig.): *Dermochelys coriacea*.

De 147 ter, 30.iv.1969, alive, Santoña (Prov. Santander).

Cendrero & Madariaga (1970: 115-116, fig.): *Dermochelys coriacea*.

Total length 192 cm; carapace, long 151 cm, wide 100 cm; width across spread fore flippers 200 cm; length of right fore flipper 90 cm; length of right hind flipper 50 cm.

The turtle was kept alive in the open dock of Santoña from April 30th till May 11th; then at the suggestion of Dr. Rodríguez de la Fuente it was tagged and released. The wounds, which the turtle had incurred from the ropes with which it was moored, were disinfected, and a substance was added to the disinfectant that might act as repellent to predators. A metal

tag was attached to the left hind flipper with the inscription: "Museo de Ciencias Naturales, Madrid-Santoña, 11-V-69. A.D.E.N.A."; the abbreviation stands for 'Asociación para la Defensa de la Naturaleza'. The tag was attached to a hind flipper as the posterior border of the fore flipper was damaged.

The turtle was taken five miles out to sea, and there it was released. At once it dived to ten fathoms, as was recorded by the echo-sounder.

De 148, ♀, 5.vi.1928, alive, Tazones (Asturias). Museo Nacional de Ciencias Naturales, Madrid.

"Ibérica", 1928, no. 374: 4 (not seen).

Mata (1928: (33)-(36), 2 figs.).

Aguilar-Amat (1928: 102), De Llarena (1928: 463), Navarro Martin (1941: 363), Navaz & De Llarena (1951: 4): *Dermochelys coriacea*.

Lozano Cabo & Quiroga (1969: 18): *Dermochelis coriacea*.

The turtle was taken off Tazonas and it was brought to Gijón, where it seems to have caused quite a sensation, the fishermen being rewarded by the government for their lucky catch, and being fined by the director-general of fisheries for having infringed the law (Aguilar-Amat, 1928: 102).

Total length 218 cm (Mata, 1928: (34)), 220 cm (Aguilar-Amat, 1928: 102); weight 480 kg (Mata, 1928: (35)).

Mata (1928: (35)) states that some 1300 eggs of the size, the shape, and colour of hens' eggs were found. Moreover about 4000 more, but much smaller eggs, the size of a cherry, were also counted, and there was a large mass of still much smaller eggs.

The intestine showed a perforation of its wall. Not a trace of food was found in the gut.

De 148 bis, spring of 1942, alive, Tazones (Prov. Asturias).

Cendrero & Madariaga (1970: 115): *Dermochelys coriacea*.

Carapace, long 140 cm; wide 89 cm; weight of live turtle 360 kg.

The turtle was preserved in a museum at Avilès.

De 148 ter, 30.x.1968, alive, Tazones (Prov. Asturias).

Cendrero & Madariaga (1970: 115): *Dermochelys coriacea*.

This turtle when alive, weighed between 200 and 300 kg.

De 149, 29.xi.1968, alive, off Cabo Prioriño, Prov. La Coruña.

"El Ideal Gallego" (1.xii.1968: 11, fig.; identification by H. Quiroga), "A.B.C.", 3.xii.1968, evening ed.: 41: *Dermochelys coriacea*.

"Het Vaderland", 3.xii.1968: Zeeschildpad.

Lozano Cabo & Quiroga (1969: 17, fig.): *Dermochelis coriacea*.

The turtle was captured by the fishing boat "Flor de Ribeira", skipper Juan Fernandez Garcia, of Mera; it was brought to La Coruña, where it died in the morning of November 30th. The carcase was sold for 400 pesetas to D. José Rodríguez Villar, who intended to dry and preserve the head.

"El Ideal Gallego" mentions the following measurements: total length, 230 cm; width across spread fore flippers, 250 cm; length of carapace, 160 cm; height of body, 63 cm; length of head, 25 cm; length of fore flipper, 90 cm; length of hind flipper, 55 cm; weight 500 kg.

I am greatly indebted to Mr. A. Rego Gonzalez Villaamil, Netherlands Consul at La Coruña, and to Prof. L. Iglesias Iglesias, of Santiago de Compostela, for the clippings from "El Ideal Gallego" and "A.B.C." respectively.

De 150, 13.vii.1966, alive, NNW of Punta Figueira, between the islands of Sálvora and Ons, at the entrance of the Ría de Arosa.

Mr. Placido R. Castro (in litt., 28.viii.1966); "Diario de Pontevedra", 29.vii.1966: 6, fig.

The turtle was taken alive by the fishing vessel "Carlitos" of Cambados; it had become entangled in drift nets. Mr. Placido Castro, who received information about it from Joaquín Oubiña Varela, of Santo Tomé, Cambados (Pontevedra) wrote about it as follows:

"1m75 in length, and almost as wide. A weight of over 400 kilogrammes. Of a dark greenish colour. Lumps on the "plastron", like small breasts. A head of a shape approaching that of a cube, with a mouth rather like that of a seal, showing a kind of fang when it was open. The flippers short and fat. This shell of a tough skin, with longitudinal folds, or rather edges. The fisherman was especially impressed by the strength of the turtle. It took ten men to haul it on board the "Carlitos", and for this purpose they had to ask help from another boat. Once on deck, the turtle moved about with great vigour, and scattered oars and implements in all directions. When it was tied to the side of the vessel it made the boat move sideways against the current."

As the turtle had become entangled in the drift nets used for sardine fishing, the fishermen thought that the turtle was feeding on these fish.

The fishermen tried to sell the turtle to the "Parador de Turismo" at Cambados, and to the "Gran Hotel" at La Toja. When they could not find a buyer for it, they released the turtle near El Grove; it swam away with great vigour and speed.

Mr. Castro adds: "A few days later I had news of the appearance of another turtle at Castiñeiras, near Santa Eugenia de Riveira, and at the extreme northern point of the Ría de Arosa. I was unable to obtain a description of its characteristics, except for the fact that it was very big. I do not

know either how it was caught. But as it turned up very shortly after the release of the one brought to Cambados, there is a distinct possibility of its being the same animal. It was kept, at least for some days, in some sort of tank or pond".

The description clearly shows the turtle to be a Leathery Turtle, and this is confirmed by the photograph in the "Diario de Pontevedra." The fact that the width is given as about equal to the length, probably means that the width was measured across the spread fore flippers.

De 151, 1849, Ría de Vigo.

Lopez Seoane (1877: 350, repr.: 3; 1884: 19): *Sphargis coriacea*.
Boscá (1881a: 282): *Sphargis mercurialis*.

De 152, viii.1950, Ría de Vigo.

The head of this specimen has been preserved in the Museo de Zoología Regional of the University of Santiago de Compostela.

De 153, 1946, Barbate de Franco, near Cadiz.

In the archives of the weekly paper "Blanco y Negro", Madrid, I saw an unpublished photograph of this turtle. The weight was estimated to have been 500 kg.

PORTUGAL

Ferreira (1892: 269), Nobre (1904: 85): *Sphargis coriacea*.
Osório de Castro (1954: 231): *Dermochelys coriacea*.

Vieira (1896) did not include the species in his list of Portuguese Reptiles and Amphibians, but he adds it at the end of his paper (Vieira, 1897: 7, *Dermatochaelis coriacea*) referring to a publication by Oliveira (1896).

Nobre (1935: fig. 51) gives a sketch representing *Dermochelys coriacea*, but he does not indicate which specimen was drawn by him. In any case the figure is extremely bad; the shape of the head is wrong, the fore flipper is of a very strange structure and it seems that a claw is indicated; the hind flipper shows four distinctly separated toes.

De 154, 20.iii.1907, Póvoa de Varzim.

Ferreira (1907: 83): *Dermochelys coriacea*.
Nobre (1935: 3; 1937: 4), Navarro Martin (1941: 363), H. Bouxin & Legendre (1947: 465): *Dermochelys coriacea*.

Ferreira (1907: 83) stated that 'lately' a specimen had been captured at Póvoa de Varzim. Nobre (1937: 4) gives the exact date and adds that the specimen has been preserved at the Aquario Vasco da Gama (Lisbon), and this is confirmed by Dr. Herculano Vilela (in litt., 2.iv.1966). When Nobre (1937: 4) stated that two records could be added, it escaped his notice that

the Leathery Turtle taken on March 20th, 1907, was the same as had been mentioned already by Ferreira (1907: 83) and by himself (Nobre, 1935: 3).

De 155, 1936?, Póvoa de Varzim.

Nobre (1937: 4): *Dermochelys coriacea*.

Nobre (1937: 4) mentions a specimen, 180 cm long, having been captured at Póvoa de Varzim and having been shown at the fisheries exhibition held there in 1936.

Lozano Cabo & Quiroga (1969: 18, *Dermochelis coriacea*) state that several specimens have been taken at Póvoa de Varzim.

De 156, vi.1953, S. Martinho do Porto.

"Diario de Noticias", 14.vi.1953 (not seen).

Ladeiro (1956: 8): *Dermochelys coriacea coriacea*.

Weight 250 kg.

De 157, Ria de Aveiro.

Ferreira (1907: 83): *Dermochely coriacea*.

Nobre (1935: 3), Navarro Martin (1941: 363): *Dermochelys coriacea*.

As for De 154, Ferreira (1907: 83) states that the specimen had been taken 'lately'.

Measurements: 180 by 110 cm.

De 158, ca. 13.v. between 1792 and 1807?, Peniche. Museu Bocage, Lisbon.

Bocage (1863: 333), Boscá (1877: 45), Sequeira (1886: 268, 273), Ferreira (1893: 25): *Sphargis coriacea*.

Boscá (1881a: 282): *Sphargis mercurialis*.

Oliveira (1896: 28): *Dermatochaelis coriacea*.

Ferreira (1907: 83): *Dermochely coriacea*.

Bedriaga (1889: 87), Ferreira (1911: 59), Ferreira & de Seabra (1911: 103), Nobre (1935: 3), Navarro Martin (1941: 362, 363), Navaz & De Llarena (1951: 4), Brongersma (1969: 79), Pritchard (1971: 32, "Perriche"): *Dermochelys coriacea*.

Lozano Cabo & Quiroga (1969: 18): *Dermochelis coriacea*.

There is some confusion about the year in which this turtle was captured. Bocage (1863: 333) mentions the year 1828, and this date has been copied by several authors. Ferreira (1907: 83) mentions 1808 as the possible year of capture, but he does not give any arguments in favour of this surmise. Nobre (1935: 3) mentions the years 1761 and 1828, thus suggesting that two Leathery Turtles had been taken at Peniche, and this was also the impression obtained by Navarro Martin (1941: 362, 363) who mentions one specimen from Peniche, dated May 13th, 1761, and one taken in 1828. In this he was followed by Navaz & De Llarena (1951: 4) who also give May 13th, 1761, as the date for one specimen, but no date for a supposed second specimen.

Finally, Lozano Cabo & Quiroga (1969: 18) mention two specimens dated from 1761 and 1928 respectively.

The only definite evidence as to the date of capture is to be found in a manuscript note on this turtle, written by Domingos Vandelli, and which has been reproduced by Ferreira (1911: 61). Vandelli states that the turtle was brought to the Royal residence of Queluz "no dia 13 do corrente mez de Maio. Dia dos Annos de S.A.R. o Principe N.Sor" (on the 13th day of the current month of May. The birthday of H.R.H. the Prince, our Master); however, Vandelli does not mention the year. The reference to the current month means that the note was written in the month and year in which the turtle was captured. The prince, on whose birthday the turtle was brought to the palace, was Prince João, born May 13th, 1767; he was regent from February 10th, 1792, to March 20th, 1816, and he reigned from the last-named date until his death, which took place on March 10th, 1826, as King João VI (Anonymus, n.d. a, 263-267).

When Nobre (1935: 3) mentions 1761 as the year of capture, this only shows that he did not read Vandelli's note (such as this was published by Ferreira (1911)) too well. In Vandelli's manuscript note the year 1761 is mentioned as that in which he published the description of a Leathery Turtle, which had been received by the university of Padua (Vandelli, 1761). That the year 1761 has no connection with the Peniche turtle is also clear from the following facts: 1°, Vandelli did not come to Portugal until 1764 or 1765; 2°, the prince mentioned in the note was not born until 1767; 3°, Vandelli refers to the works of the "Conde de la Cepede", which were first published in 1788. Furthermore, if the turtle had been taken in 1761, Vandelli would have included it in his list of Lusitanian animals (Vandelli, 1797), the manuscript of which was dated April 1787.

There are two facts that prove that 1828 cannot be the year of capture, viz., 1°, the prince upon whose birthday the turtle was brought to the palace, King João VI had died in 1826, and 2°, Vandelli had died in Lisbon on June 27th, 1816 (Anonymus, n.d. c: 109).

It is not clear why Ferreira (1907: 83) mentioned 1808 as the possible year of capture, unless he considered 1828 a typographical error, and as it could not be 1818 either, he decided for 1808. However, it seems unlikely that 1808 could be the year of capture. On November 27th, 1807, Prince João and the Royal family embarked for Brazil; on November 29th the fleet sailed, just as the French army under General Junot entered Lisbon (Napier, 1850: 59). King João VI returned to Portugal only on July 4th, 1821. The French army occupied this part of Portugal until the end of August 1808 (Napier, 1850: 90), and it had a garrison at Peniche. That the French were

very much in force, follows from Junot's orders to Vandelli to send part of the collections of the Museu de Ajuda to Paris; three consignments were despatched on June 3rd and 12th, and on August 1st, 1808 (Ribeiro, 1873: 355). It seems unlikely, that under the circumstances which prevailed in Portugal at the time, fishermen from Peniche would be allowed to bring a Leathery Turtle to the Queluz Palace to commemorate the birthday of the absent prince.

It is also unlikely that the turtle was captured between August 1808 and the date of Vandelli's death in 1816. Vandelli, who had had dealings with the French army of occupation (e.g., about the collections that had to be despatched to Paris), was regarded as highly suspect after Portugal had been liberated, and it is doubtful if he had any contact with the Queluz Palace at that time. In 1810, notwithstanding he was eighty years old and notwithstanding the infirmity that went with his old age, Vandelli was taken into custody; with some other people, he was sent to the ilha Terceira (Azores) on board of the frigate "Amazona". Soon after he arrived on the island he was allowed to move to England and there he stayed until the general peace had been concluded in 1815. In that year he returned to Portugal, but until his death on June 27th, 1816, he lived in a state of almost complete feeble-mindedness (Anonymus, n.d. c: 109).

The fact that Vandelli speaks about: 'the Prince our Master' makes it likely that the turtle was presented during the regency, i.e., between February 1st, 1792 and the date the Royal Family embarked for Brazil on November 27th, 1807. It is hoped that one day more information may be found in Portuguese archives, and that then the exact year can be settled. However, it is clear that where some of the authors cited above speak about two turtles, they erred and that as far as the evidence goes there was only one Leathery Turtle captured at Peniche.

From the data given by Vandelli, Ferreira (1911: 60) calculated the measurements to be: total length, 246 cm; width across the spread fore flippers, 264 cm; weight, 421.350 kg. Vandelli gave the length in Parisian measure, and the weight in quintals and arretel, i.e., in Portuguese measure. Ferreira does not indicate how he converted Vandelli's measurements into metric measure, but I believe that some slight errors were made. The old Parisian 'pied' equals 32.48 cm, and the Parisian 'pouce' equals 27 mm; thus the total length of 7 pieds, 5 pouces equals $7 \times 32.48 + 5 \times 2.7 \text{ cm} = 227.36 + 13.5 \text{ cm} = 240.86 \text{ cm}$ or 241 cm; the width across the spread flippers of eight pieds is 259.8 cm. The Portuguese quintal was equal to 58.75 kg, the arretel is equal to 0.459 kg; thus 7 quintaes 3 arrateis are equal to $7 \times 58.75 + 3 \times 0.459 \text{ kg} = 411.25 + 1.377 \text{ kg} = 412.627 \text{ kg}$.

De 159, 15.vi.1965, off Sesimbra, in water of 150 fathoms. Museu Bocage, Lisbon.

Prof. Dr. G. F. Saccarão (in litt., 17.v.1967).

Length of carapace (between perpendiculars) 160 cm.

De 160, 28.vii.1962, dead, off Faro.

The specimen was seen by Dr. W. Vervoort, and Messrs. W. H. Lamme, W. J. Roosdorp, and G. F. P. Zuyderhoudt, when by courtesy of the Portuguese Navy they made a trip off the coast of Faro in the Corvette "Bicuda", commandant Primeiro Jorge Teles de la Faria Correia Bastos.

De 161, 1871, Portugal?

Ferreira (1907: 83), when commenting upon the Leathery Turtle from Peniche, refers to a second large specimen taken in 1871. No locality is given.

De 162, 12.ix.1934, Portugal.

Navaz & De Llarena (1951: 4, *Dermochelys coriacea*) mention this record, but without any further information as to locality, measurements, etc.

De 163, date and locality unknown.

Dr. Herculano Vilela informed me (in litt., 2.iv.1966) a specimen was captured some years ago for the Aquário Vasco da Gama, where it died after a few days. The locality, and the date of capture were not noted at the time.

I B. List of records of unidentified turtles, which probably were *Dermochelys coriacea* (L.).

SEA BETWEEN ICELAND AND THE FAEROES (FAERØER)

Ud 1, 26.vii.1957, alive, 90 miles NNW of Mýlingi (Faerøer).

Mr. K. Jakobsen (in litt., 25.ix.1967).

The turtle was observed by Mr. Martin Kruse, who gave the following information. As in similar circumstances, the turtle was at first taken to be an overturned rowing boat, but when Mr. Kruse came closer to it a head was observed to stick out of the water. This head had a size comparable to that of a six or seven years old child. Attempts to capture the turtle failed, as the boathook repeatedly slid off the shell.

Ud 2, vii.1958, alive, about 100 miles NNW of Mýlingi (Faerøer).

Mr. K. Jakobsen (in litt., 25.ix.1967).

Mr. Kruse stated that in 1958 (at about the same time as in 1957) he saw again a turtle; this time about ten miles more to the north.

GREAT BRITAIN

ENGLAND

Ud 3, Ud 4, 4.vii.1952, alive, off Day Mark Head, St. Martin's, Isles of Scilly (Cornwall).

"Scillonian", **27**, no. 111, ix.1952; P. Z. Mackenzie (in litt., 16.xi.1955): "Turtles were seen by Mr. Alan Goddard off Day Mark (St. Martin's) on July 4th and were lost to view after being followed by boat to White Island."

Frazer (1953) mentions two turtles seen off the Scilly Isles on 5.vii.1952, one of which is stated probably to have been *Dermochelys coriacea*. This record is probably based upon the same turtles as have been mentioned in the "Scillonian". On the basis of Frazer's suggestion that one of the two may have been a Leathery Turtle, both specimens are included here. It is well known that Leathery Turtles may come to an area in small groups, and it is more likely that two Leathery Turtles were sighted at the same time than that the two turtles would have belonged to different species.

Ud 5, 3.viii.1839, alive, about 2 miles from Penberth Cove (Cornwall).

Anonymus (1839): turtle.

Couch (1844: 149): *Testudo coriacea*.

Cornish (in Couch, 1878: 30, note): not identified.

J. Clark (1906: 307): probably *Sphargis coriacea*.

Anonymus (1839) wrote: "On Saturday last about 7 o'clock in the evening as the Trinity Buoy Yacht was coming into the Bay from the Wolf Rock, something was observed about 2 miles from Penberth Cove, floating on the water, which appeared to be a boat bottom up. They bore away towards it and discovered it to be an immense turtle. They manned their boat, and pursued it for more than an hour, during which it dived and rose to the surface several times. They were within the boats length of it twice, but it eluded all their attempts to take it. They report it is the largest they ever saw."

Couch (1844: 149), although he did not see the specimen, referred to it under the Coriaceous Turtle, *Testudo coriacea*. Although there is nothing in the report to allow of a definite identification, the remark that it was an immense turtle and the date, upon which the observation was made, point to Couch's identification being correct.

Cornish (in Couch, 1878: 30, note) mentions this turtle as having been sighted off the Wolf Rock, and J. Clark (1906: 307) places the event "near Land's End".

I had some hopes that the original report by the crew of the Trinity Buoy Yacht might still be available, and that Trinity House might have other

reports on turtles, but I was informed (letter of June 10th, 1965) that the majority of the early records of Trinity House were destroyed by fire in 1940.

Ud 6, 20.viii.1966, alive, 4 miles West of the Runnelstone buoy, Mount's Bay (Cornwall).

"The Cornishman", 28.viii.1966.

The turtle was sighted by Captain Len Davies, of the "Queen of the Isles", Penzance to Isles of Scilly, by the crew and by many of the passengers.

"The Cornishman" wrote: "Yes it must have been a turtle — an estimated ten feet long and six feet across and weighing, Capt Davies thought, in the region of two tons — enough for how many tins of soup?"

"When it was sighted it appeared to be a grey mass with barnacles and other "marine hitch-hikers" stuck to its back. It just floated there — until the bow-wash of the ship, which was leaving the ocean behind at a steady 14 knots, struck it. This prompted it into life — four massive flippers and a head appeared and it took off like a great fat speed-boat."

"On second thoughts it decided to play at being a great, fat submarine — and that was the last that anybody saw of it."

"Mr Davies said that they got within 20 ft. of the turtle, and that is what it was — he saw a few of them in the Caribbean during the war."

Although the estimated measurements will have been exaggerated, there is no doubt about a very large turtle having been sighted. There is nothing in the report to allow of a definite identification, but the great size, and the date point to the turtle having been a Leathery Turtle. The description of its being a "grey mass" also points to this. The remark of "barnacles and other marine hitch-hikers" sticking to its back does not fit a Leathery Turtle. However, one may remember that Mr. J. H. B[arrett] (in: Crothers, 1966: 139) stated that the observer of a Leathery Turtle in St. Bride's Bay (De 37b) at first mistook it "for an upturned dinghy with barnacles on it". The impression of the turtle having barnacles on its back may have been caused by the whitish flecks on the carapace, and/or by the tubercles of the keels.

Ud 7, ix.1954, alive, the Manacles (Cornwall).

"West Briton", 16.ix.1954: "Turtle in crab-pots. Hauling in their crab pots near the Manacles last week, Messrs. J. and S. Tripconey, of Porthallow, found a turtle weighing nearly five cwt. clinging to the ropes. The turtle was released and disappeared into the water."

Turk & Penhallurick (1966: 7): unidentified.

If the weight has been estimated correctly, this makes it very likely that the turtle was a Leathery Turtle. The fact that the turtle had become entangled in the ropes attached to crab pots may also be considered an argu-

ment for identifying the turtle with *Dermochelys coriacea*. There are various instances of Leathery Turtles having become entangled in the lines of crab pots or lobster creels (e.g., De 8, De 13, De 29, De 93, De 94, De 98, De 126), but as yet this has not been reported of the other species of turtle.

Ud 8, viii.1943, alive, off Mevagissey (Cornwall).

"Daily Mail", 9.viii.1943.

"Two Mevagissey, Cornwall, fishermen set about this week to search for lobsters. But it wasn't lobsters they caught but a huge tropical turtle half as long as their 22 feet boat and weighing nigh on 170 lb." (ca. 77 kg).

The British Museum (Natural History) did not succeed in obtaining any further information. The estimate of the length is, of course, somewhat exaggerated, and that of the weight probably underestimated. However this may be, apparently a large turtle was captured (and probably released), and there is again this association with lobster fishery. We may assume that the specimen was a Leathery Turtle.

Ud 9, date?, Selsey (Sussex).

Heron-Allen (1938) discussing turtle records from the Sussex coast, concluded that the information given him by the local people pointed to a Leathery Turtle having been stranded near Selsey in the past. There is no confirmation of this record, which must be considered doubtful.

For a turtle captured off Scarborough in 1748 or 1749, and referred to *Dermochelys coriacea* by some authors, see Un 40.

CHANNEL ISLANDS

Ud 10, 1958, Channel Islands.

In a letter of November 21st, 1958, addressed to Mr. J. C. Battersby, Mr. E. M. Venables wrote: "Mr. Morton Swinburne tells me that a large turtle was seen recently in the Channel Islands."

No further information is available, and the Jersey Museum has no data to confirm this observation. It is not impossible that this doubtful record formed the basis for the record of *Dermochelys coriacea* from the Channel Islands given by Taylor (1963, chart 8).

Ud 11, 31.viii.1965, about halfway between the North-West Minquiers Buoy and Corbière.

"The Evening Post", Jersey, 2.ix.1965; Mr. H. L. G. Amy (in litt., 3.ix.1965, and 17.ix.1965).

The turtle was observed by Mr. C. Challinor, of the St. Helier Yacht Club, Jersey, and by his son. Observations were made difficult by the

suddenness of the sighting, the choppiness of the sea and the speed of the yacht. Mr. Challinor estimates the length, inclusive of head and neck, as well over five feet. "His son, who because of his position in the yacht had the closest view as they passed within two or three feet of the turtle, says he could not distinguish the pattern of the plates composing its shell as they did not stand out in a bold pattern such as is seen on a land tortoise, but he had the impression that a darker line ran from the head down the centre of the back and that there was also a dark transverse line across mid-way down" (Amy, in litt., 17.ix.1965).

In trying to identify this turtle I would like to suggest that the "pattern of the plates composing its shell" could not be distinguished, because the turtle was a Leathery Turtle, which does not have plates on the shell. The darker line running down the centre of the back then would be the median ridge of the carapace. The statement about "a dark transverse line across mid-way down" rather puzzles me; "mid-way down" points to the line being on one of the sides of the carapace and then it could be one of the other ridges, but this would not fit the description of the line being "transverse".

EIRE

Ud 12, 18.vi.1967, alive, about a mile outside Youghal Harbour.

Mrs. Shirley Glover (in litt., 28.vi.1967).

Writing about the Leathery Turtle sighted off Lundy (De 45), Mrs. Glover added: "The second occasion my husband and I were on our own and it was just over a week ago on Sunday June 18th, this time off the coast of Southern Ireland, about a mile outside Youghal harbour. The sea conditions were similar though with rather more wave movement, but this time we were unable to get close enough to identify the species, although it looked very similar in shape and size to the one previously seen off Lundy."

Although no identification could be made, it is very likely that this was a Leathery Turtle.

I C. *Dermochelys coriacea* (L.). Discussion

The data, which have been arranged geographically in the list of records, have been arranged chronologically (year by year) in table 2. The number of records varies from year to year, and to show these variations more clearly, the numbers of records from the northern and central areas for the years 1901 to 1970 have been presented graphically in fig. 32. It is interesting to note that since 1954 Leathery Turtles have been observed in the northern and central areas almost every year; in the northern area the exception is the year 1969, and in the central area no records are available from the years 1962

and 1970. The absence of data for these years need not necessarily mean that turtles did not visit these areas, but it may be due to the occurrences not having been reported. The strong increase in the number of records is shown in tables 3*a* and 3*b*. In the central area a sudden increase in the number of records set in during the period 1921-1930, the number decreased again in the period 1931-1940 and 1941-1950. In this connection it may be pointed out that no records from the central area were obtained in the years 1939 to 1946, and this is no wonder, because this period embraced the second world war. Likewise no records from the northern area are available from the years of the war; circumstances were definitely unfavourable for observations at sea, and if Leathery Turtles have been observed by ships of the respective navies, the data will not have been published as they might give information about the movements of ships. The war being over, and the situation having become normal again, Leathery Turtles were recorded once more, and in the last two decennia (1951-1960, 1961-1970) the number of records increased suddenly and tremendously, especially in the northern area. Various causes will have contributed to the greater number of records. A slight rise in the temperature of the surface water in more northern parts of the ocean will make it possible for turtles to penetrate farther to the north. However, periods with a higher temperature of the surface water will have occurred in the past also, and the fact that no great numbers of specimens have been placed on record in previous periods shows that there must be at least one other reason for the high numbers of records in the last decennia. It is believed that the higher number of fishing vessels out at sea, vessels with greater speed, and easier to manoeuvre, and the increased interest in the occurrence of turtles will have helped to place on record more observations on Leathery Turtles.

As has been mentioned already it has been suggested that the number of records, such as it is given here, may be too high, as some specimens are said to have been recorded twice (e.g., De 21, De 22), thrice (e.g., De 26, De 27, De 28) or even four times (De 37*a-d*). However, there are indications that two or more Leathery Turtles may arrive together in the same general area at about the same time. In 1756 two Leathery Turtles (De 48, De 49) were captured off the Cornish coast, at about the same time, be it at least thirteen or fourteen nautical miles apart. In 1913 two Leathery Turtles (De 60, De 61) were said to have appeared off Lowestoft, one of which was captured (Patterson, 1914: 1). Anonymus (1957) mentions three turtles having been captured off Ushant at about the same time (De 79, De 80, De 81). Duguay (1968: 10) mentions the observation by J.-C. Menu who reported having seen a dozen Leathery Turtles on one evening (the high peak for the central

area for 1963, fig. 32, is due to this observation). In dealing with the presence of *D. coriacea* off the coast of Maine, U.S.A., Moulton (1963) also came to the conclusion that a small group of these turtles had arrived there together. These examples (to which others may be added), have led me to treat observations made at different localities on different dates (e.g., De 21, De 22) or made in the same area but on different dates (e.g., D37a-d, one sighting in August, and three observations, about a week apart, in September) as separate records.

The records do not have an even distribution over the months of the year. Table 4 gives a survey of the distribution of the individual records over the months of the year, and these data have been recapitulated in table 5. In these tables it has also been indicated whether the specimens were alive or dead. To avoid misunderstandings it may be mentioned that a turtle which becomes entangled in a net, which is drowned, and which was dead when hauled up, has been included among the live turtles (e.g., De 122) because it was alive when it became entangled. The same applies to a turtle (De 133) found dead on the surface of the sea but which had died from wounds inflicted during a previous attempt to capture it. Thus, under the heading "dead" only those turtles have been grouped that were found dead, drifting on the surface of the sea, or stranded on beaches.

In a few instances it is probable that the turtle died an accidental death, e.g., in those instances that deep gashes in the shell (De 71, De 73) or damage to the head (De 74, De 130) can be attributed to a blow from a ship's propeller; in three instances (De 62, De 73, and De 102) bullet wounds were found. Although accidental death may be accepted for these turtles, there is no proof whether the damage was inflicted before or after death.

The data from table 5 have been graphically represented in figs. 36, 37. To narrow down the period in which Leathery Turtles are most numerous, the figure does indicate the numbers of records for the two halves of each month as well as the number for the month as a whole. A comparison of the data for the northern and central areas gives the following results. In the central area 76 out of 84 records (i.e., 90.5 per cent) are based upon live Leathery Turtles, and only 6 records (7.1 per cent) are based upon dead specimens. In the northern area the number based upon live turtles is relatively lower and that based upon dead specimens is relatively higher; out of 90 records, 67 records (or 74.4 per cent) are based upon live Leathery Turtles, and 22 records (or 24.4 per cent) are based upon dead specimens. With the exception of the months of January and March, live Leathery Turtles have been observed in the central area in all months of the year. In the northern area live Leathery Turtles are present in a much more limited period, viz., from June to Novem-

ber. If the records for the halves of the months are examined it proves that in both the northern and central areas the number of records is highest in the first half of September. In the central area dead Leathery Turtles have been found in the months of June, July, and October; of two specimens the month is not known, but they are stated to have been found in the summer. Thus, in the central area dead specimens are found in months when also live Leathery Turtles are fairly common. In the northern area dead specimens have been found in all months except June and July. Of the five dead specimens found in August in the northern area, two (De 71, De 73) showed damage by a ship's propeller, and two (De 62, De 73) showed bullet wounds. The fact that specimens with such wounds are found at a time when the conditions for the existence of turtles in the area are at their best, rather suggests that these specimens met with an accidental death. However this may be, in the period August-October, the number of dead specimens found in the northern area is much lower than that of the live specimens. In November the numbers of live and dead specimens are equal and after that (December-May) only dead specimens have been recorded from the northern area. This suggests that in November the situation becomes unfavourable for Leathery Turtles, and that these either withdraw from the northern area when the surface temperature of the sea drops or that they die when the water becomes too cold.

Little is known about the lowest surface temperature at which *D. coriacea* can survive. In dealing with Leathery Turtles from Nova Scotian waters, Bleakney (1965: 123) points out that they do not show any signs of being benumbed at surface temperatures ranging from 55° to 65° F (about 12.8 to 18.3° C). McAskie & Forrester (1962: 646) reported upon a very active Leathery Turtle found near the Queen Charlotte Islands (British Columbia) at a surface temperature of 53° F (11.75° C). When recording the occurrence of Leathery Turtles off Lowestoft, in November 1913, Patterson (1914: 1) stated that the temperature of the sea was above normal. Dr. H. A. Cole (in litt., 14.iii.1966) informs me that "the value for November 1913, converted to Fahrenheit was 52.9°, compared with a long-term value of 49.5°". From these data it is evident that *D. coriacea* can stand surface temperatures as low as 11.6° C, but we do not know whether it will survive for any length of time at such temperatures, nor do we know how much lower the temperature may become before the turtle succumbs. For the present it seems safe to assume that *D. coriacea* will not survive when the surface temperature drops below 11° C. This assumption is based on the one hand on the fact that live Leathery Turtles have only been observed in the northern area in months in which the temperature rises above 11° C, on the other hand that in colder

months only dead turtles or no turtles at all have been observed. The period in which the surface temperature rises above 11°C varies, of course, from place to place. Thus in the North Sea this period extends from June to November; off the Norwegian coast, in about 63°N , from June to September, and farther north, in about 69°N , a temperature of 11°C or higher is reached only in August and September. In the same place there will also be differences from year to year; in one year temperatures will be higher over a longer period than in another year; various examples of this will be found in the "Annales Biologiques" published by the Conseil Permanent International pour l'Exploration de la Mer, Charlottenlund Slot, Denmark. However this may be, in northern latitudes at the end of the summer and farther to the south in autumn, the temperature goes down and when it drops below 11°C the conditions will become definitely unfavourable for *D. coriacea*. Willgoos (1958) suggested that *D. coriacea* might pass the winter off the Norwegian coast. This seems highly unlikely to me as the temperatures in the seas to the west of Norway drop well below 11°C during the winter. In this connection I may point to an observation by Gunter & Hildebrand (1951: 732) on a dead Leathery Turtle that drifted ashore in the northwest part of Copano Bay at the town of Bayside, Texas, after a very cold spell in 1951; the temperature in the open bay dropped to 38°F (3.33°C) and the air temperature dropped to 18°F (-7.8°C). There is, of course, no definite proof that this turtle died from the cold, but I believe it can be reasonably assumed that this was the case. Similar circumstances will often be found in Norwegian waters close to the coast, and although the surface temperature may be a few degrees higher far from the coast, in winter it will never be high enough to allow Leathery Turtles to survive. When the surface water becomes too cold, other marine animals, like fish and Crustacea, may move into deeper parts of the sea. For turtles this is impossible because they have to come to the surface from time to time to breathe. It may well be that very low air temperatures are equally prohibitive to the surviving of Leathery Turtles in northern latitudes as low temperatures of the surface water.

The possibility cannot be excluded, of course, that in very mild winters a Leathery Turtle may survive longer in the northern area, and in this respect there may be a marked difference between Norwegian waters and the seas farther to the south (e.g., off the west coast of Ireland).

In the central area the situation will be somewhat more favourable as the temperatures in winter will remain higher than in more northern latitudes.

Little can be said about the southern area. Of only five records the month is known. Live Leathery Turtles have been observed in March, May, June, July, and August. There is one record of a dead specimen (De 160) seen

drifting at sea off the south coast of Portugal in July. In the southern area Leathery Turtles have not yet been recorded from August to March.

While the majority of the records for the other species (e.g., *Caretta caretta*) are based upon specimens that were stranded (either alive, or dead) most records of *D. coriacea* are based upon specimens that are captured or sighted at sea. As yet there is only one definite record of a Leathery Turtle having been found alive on a beach in the northern area (De 19, October 1968). It is not impossible that the live animal (Ut 6) which was caught by the low tide on the island of Herm (Channel Islands) was a Leathery Turtle too. From the central area there are two records of specimens of which it is not stated whether they were alive or dead (De 127, De 147 bis) on a beach. For the rest, all records of stranded Leathery Turtles from the northern area (18 specimens) and from the central area (5 specimens) are based upon dead specimens. Moreover, four dead specimens were found floating at the surface in the northern area, and one in the central area.

A few words may be said about the chances at surviving of recorded Leathery Turtles. Of the 67 records of live Leathery Turtles from the northern area, 33 records were based upon sightings and in six instances the turtles were captured and released; one turtle (De 11) was harpooned and later it was thrown back in the sea, but it is not known whether it survived. However, out of 66 live turtles, 40 specimens, or 59.7 per cent were not killed in the northern area. In the central area sixteen live Leathery Turtles were sighted, two were released after having been captured, and one captured turtle escaped, and thus out of 76 live turtles, 18 specimens, or 25 per cent survived in the central area. This percentage is only reached through the sighting of a dozen Leathery Turtles by Mr. J.-C. Menu (De 119a-l), otherwise only 3.3 per cent of the live turtles would have a chance at survival.

Thus, generally speaking, Leathery Turtles do not stand much chance to survive for long in the central area; most of them are captured sooner or later, and this means their death. In British and Irish waters Leathery Turtles have a fair chance to stay alive at the time they are observed; they are not captured, or they are released again (sometimes because no buyer can be found, or because the Royal Society for the Prevention of Cruelty to Animals pleads for their release, or just to give the turtle a sporting chance). One may well ask what the fate is of the Leathery Turtles that come to European Atlantic waters in summer and that escape capture, because in winter no live specimens have been found in the northern area and only a very few have been taken in the central area. Do they die from the cold, or do they turn back to warmer seas in subtropical or tropical regions?

Bleakney (1965) dealt with the occurrence of turtles off the East coast

of North America from Connecticut to Newfoundland. He stresses that our old concept that turtles found in northern waters are just stragglers that have gone astray cannot be accepted anymore. Every year Leathery Turtles come to this area in the months July to October, and their movement into cooler waters for part of the year may form part of their normal pattern of life. Bleakney (1965: 124) concludes that "these northward travels are made by healthy turtles of various age and both sexes capable of navigating the North Atlantic and quite able to leave the Gulf Stream, penetrate the Labrador Current, and navigate away again by late September." He adds the question "Do some individuals then turn southward to nesting sites in the Caribbean while others follow the Gulf Stream towards Europe?"

Whether the Leathery Turtles found in European Atlantic waters first spend a summer off the East coast of North America, then to move on across the Atlantic to arrive off our coasts in the next summer is a problem that cannot be solved at this moment. The solution might perhaps be obtained by a marking experiment. However the number of Leathery Turtles in the seas off the Connecticut-Newfoundland area and the number of specimens observed off European coasts is so low that the chances of recovering tagged specimens and of a speedy solution of the problem are slight. It is also well possible that some Leathery Turtles move straight on to European waters without spending a summer off the coasts of New England, Nova Scotia, or Newfoundland.

The fact that a number of dead Leathery Turtles have been found in the northern area during winter is an indication that at least some of them are killed by the cold to be washed ashore afterwards. Others may die and drift around to disintegrate at sea, in this way quietly fading out of the picture without being recorded. Still, the possibility cannot be excluded that some of the Leathery Turtles observed in European Atlantic waters may leave the northern and central areas alive to go to warmer parts of the ocean. Whether they go back to nesting sites in the Caribbean, or whether they move southwards along the coasts of Europe and Africa is an open question. If the last-named route is followed, one would expect that at least a few of them would have been recorded in autumn along the coasts of Spain and Portugal, which as yet is not the case. Another question is, whether turtles that withdraw from the northern and central areas in autumn do go all the way back to tropical seas, or that they withdraw just far enough to survive comfortably to return to the northern area next summer. In this connection I may mention the statement by Mr. A. H. Harries (cf. De 38- De 43) who writes that a large turtle has been visiting Carmarthen Bay, Wales, every summer for a number of years. Without further evidence I find it hard to believe that it

is the same turtle that comes to Carmarthen Bay for a number of years, but it is not wholly impossible that a turtle will withdraw to warmer parts of the ocean to return to the same spot next summer. Again, a marking experiment may prove whether or not turtles do return to the same parts of northern waters in consecutive years.

With regard to specimens found dead, drifting around or drifted ashore, it will be of importance to check whether any indications of accidental death (bullet wounds; gashes caused by propellers) are present. It will be difficult, of course, to discern between wounds that have caused the death of the turtle or damage incurred post mortem.

Size. In many reports an indication of the size is given, but there is no uniformity in the measurements used. Some authors give the total length from the tip of the beak to the tip of the tail; others mention the length from the tip of the beak to the posterior tip of the carapace. Sometimes the width across the spread fore flippers is mentioned and in other reports the length of the carapace is used. However, it is rarely mentioned how the length of the carapace was taken, and there are at least five different ways to do so: 1°, with a flexible tape along the curve of the median ridge to the posterior tip of the carapace (Hughes, Bass & Mentis, 1967: 9); 2°, with a flexible tape along the paramedian trough of the carapace (Pritchard, 1971: 9); 3°, with a flexible tape along the curve of the paramedian ridge to the posterior tip of the carapace; 4°, the median length of the carapace between perpendiculars (straight-line measurement); 5°, from the most anterior point of the paramedian ridge to the posterior tip of the carapace between perpendiculars. For two specimens (De 49 bis, De 63 bis) I have indicated the length of the carapace in four different ways to show the differences. The differences between 'curved carapace length' and 'perpendicular carapace length' are also evident from Hughes's data (Hughes, 1971: 19; in: Pritchard, 1971: 11, upper table). In some reports just the length is mentioned without indicating whether the total length or the length of the carapace is meant. The various measurements, and the inadequate indication of what kind of length was meant, make it impossible to make trustworthy comparisons. The converting of old measures into the metric system may lead to errors (cf. De 158), and this makes one wary to attach too much importance to measurements that were taken long ago.

If the length of De 34, said to have been about 3 feet (about 91.5 cm) was the total length, this would be a specimen of a size that is but rarely met with (cf. Brongersma, 1970b: 323-324). If the measurement is the length of the carapace, De 34 and De 54 are of equal length, and they would have

the smallest carapace recorded for European Atlantic waters, the next in line being De 33 with the carapace 3 feet 9 inches (about 114 cm) long. The largest carapace (measured along the curve) is that of De 126, which is 170 cm long. The total length as indicated in literature and correspondence varies from 3 feet, or 91.5 cm (De 34, if the total length is meant), or from about 150 cm (De 109) to 271 cm (De 124). Of the specimens of which the total length is given, the sex of only twelve is known, six males and six females. The six males have a total length of 187 cm (De 20), 188 (to posterior tip of carapace De 5), 190 (De 63 bis), 210 (De 8), 215 (De 6), 244 cm (De 73), five females of 172 cm (De 49 bis), 178 (De 30), 185 (De 7), 193 (De 29), 194 cm (De 2), and of one female (De 47) the length is said to have been between 7 and 8 feet (213-244 cm). As mentioned by Pritchard (1971: 13) there is no distinct difference between the sexes. The carapace length of four males is 138.5 cm (De 20), 142.5 (De 63 bis), 153 (De 6), 162.5 cm (De 5), and of four females it is 135 cm (De 49 bis), 144.5 (De 7), 151 (De 2), and 154 cm (De 29). These four females come into the lower part of the range of variation of mature Leathery Turtles (cf. Pritchard, 1971: 10). The smallest of these females (De 49 bis, carapace length, straight, 135 cm, along curve median keel 142 cm, and paramedian trough 135 cm) showed no traces of being fully mature (the ovarian eggs were minute). Although there is no doubt about some specimens being fully mature (e.g., De 111, of which some eggs were as large as oranges) many of the Leathery Turtles in European Atlantic waters are fairly young.

The width across the spread fore flippers has been indicated for sixteen specimens as ranging from 193 cm (De 44) to 315 cm (De 49); of only five of these specimens the sex is known; ♂♂: 230 cm (De 63 bis), 250 cm (De 6); ♀♀: 202 cm (De 49 bis), 225 cm (De 93), 230 cm (De 29). It would be premature to conclude from these scanty data that there is a difference between the sexes with regard to this measurement, it is just that in this instance the males were larger than the females.

Another way to indicate the size is to mention the weight. As remarked by Pritchard (1971: 11-12) the exact weight of Leathery Turtles is only rarely ascertained; in most instances estimates are given, and sometimes these estimates are greatly exaggerated, e.g., of De 47 'The Times' gave the weight as having been a ton (i.e., 2240 lb, or 1016 kg). For some specimens the weights seem to be fairly well established and these weights are given in table 6.

Sex. Only rarely the sex of the specimens has been recorded, viz., in the northern area seven males and seven females were recorded, and in the central

area one male and seven females have been reported. It is impossible to draw any conclusions from these scanty data with regard to the sex ratio of Leathery Turtles that reach European Atlantic waters. In the majority of cases the specimens will have been dissected very roughly and under such circumstances the ovaries will be noticed more easily than the testes. In some males (e.g., De 49 bis, De 73) the penis has protruded, in others the sex can only be assumed from the length of the tail, which in males extends not only well beyond the posterior tip of the carapace, but also beyond the hind flippers.

Food. Recently I dealt with the diet of *Dermochelys coriacea* arriving at the conclusion that the food consists mainly of medusae and of Salpae (Brongersma, 1969: 95-96), and further of animals that are associated with jellyfish (such as juvenile fishes; Amphipods) and with Tunicates (Amphipods), as well as the prey of the medusa (fish). It was suggested that sea-grass found in the gut of Leathery Turtles was taken more or less accidentally when the turtle was feeding on jellyfishes present on sea-grass pastures, and that algae were swallowed when floating on the surface between jellyfishes and Tunicates. The possibility that squids are taken (Sears, 1887: 93) cannot be excluded, although the evidence is very meagre as yet. It must be added that Montoya (in: Pritchard, 1971: 14) reports fish remains and a large number of hatchling ridleys (i.e., *Lepidochelys olivacea* (Eschsch.)) from the stomachs of Leathery Turtles from Pacific Mexico. The gut of a female from Cornwall (De 49 bis) contained small fragments of tissue, of bloodvessels, and of partly digested bones that must have derived from fish. Whether the turtle swallowed a whole fish is not clear; it may be that the fragments derive from part of a dead fish.

In the gut of the male from Ameland (De 73) a piece of plastic was found, the Cornish female (De 49 bis) had some small plastic bags in its stomach and further posteriorly in the intestine another plastic bag was found.

The diet of the Leathery Turtle proves to be more varied than followed from the data mentioned by me in a previous note (Brongersma, 1969, table 2). It is hoped that in the future more contents of the gut will be preserved for study; only in this way a more complete survey of the Leathery Turtle's food can be obtained.

II. *Caretta caretta* (L.), Loggerhead (Turtle)

In English this species is also known as the Common Loggerhead, or the Atlantic Loggerhead; Dutch: Onechte Karettschildpad, Valse Karettschildpad;

French: Tortue caouane, Caouane; German: Unechte Karettschildkröte; Norwegian: Uekte Karett; Spanish: Tortuga boba.

General statements about the occurrence of this species in European Atlantic waters have been made, inter alia, by:

Schreiber (1875: 512), Heilprin (1887: 313), Keller (1895: 329): *Thalassochelys corticata*;

Schmiedeknecht (1906: 259): *Thalassochelys atra*;

Schreiber (1912: 761): *Thalassochelys caretta*;

Babcock (1919: 346), Dottrens (1963: 247), Brongersma (1966: 52-56), Peters (1967: 384), M. [A.] Sm[ith] [&] A. d'A. B[ellairs] (1967: 312): *Caretta caretta*;

Mertens & Müller (1928: 23; 1940: 21), Mertens & Wermuth (1960: 69): *Caretta caretta caretta*.

The occurrence in the North Sea is mentioned by:

Matschie (1897a: 69), M[at]sch[ie] (1897b: 568): *Thalassochelys caretta*;

Schäfer (1962: 19): *Caretta caretta*.

On the other hand, Ackermann (1883: 356) states that turtles do not occur in the North Sea.

II A. List of records of *Caretta caretta* (L.)

RUSSIA

Ca 1, 1964, alive, Murmansk Barents Sea.

Konstantinov (1965: 111, fig.), Brongersma (1966: 53; 1967a: 2; 1968a: 28), Peters (1967: 384): *Caretta caretta*.

A small turtle became entangled in a fishing line, and was brought to the surface at Murmansk. Able Seaman A. Rumjantsev reported this to the editors of "Priroda", and the record was published by Konstantinov. A photograph, illustrating the article, shows a group of sailors (one of which has the turtle in his hand) in white uniform, and hence it may be assumed that the event took place in summer.

NORWAY

The occurrence of this species in Norwegian waters is mentioned by Mertens (1960b, 1964, 1968a: 24): *Caretta caretta caretta*.

Ca 2, ♀, 15.xii.1951, dead, South coast of Tviberg Island, Askvoll (61°20'N, 4°50'E), Sogn og Fjordane.

Willgoos (1953a: 478, fig.; 1953b: 3; 1956: 543-544), Holgersen (1960a: 132), Matheson (1960: 989), Brongersma (1961: 3): *Caretta caretta*.

Total length 1120 mm; carapace, long 785 mm, wide 650 mm; weight 59.5 kg.

The ovaries measured about 150 mm in length, and 15 to 30 mm in width; the largest eggs had a diameter of 2-2.5 mm.

A number of live goose-barnacles were attached to the shell.

GREAT BRITAIN

The presence of the Loggerhead in British waters is mentioned, *inter alia* by:

- Chenu & Desmarest (1856: 39): *Chelonia caouanna*, in subgenus *Thalassochelys*;
 Larousse (1867: 1123): chélonée caouanne;
 Figuier (1869: 178): *C[helonia] caouana*;
 True (1884: 148), E. Smith (1898-99: 22), Besnard (1948: 186): *Caretta caretta*;
 Figuier (1892: 163): *Chelonia caretta*;
 E. Smith (1898-99: 22): *Thalassochelys caretta*;
 Lennier (1904: 215): caouanne;
 Babcock (1919: 346), Flower (1933: 751), H. W. Parker (1935: 37), Fraser & H. W. Parker (1949, 1953: 40), Matthews (1952: 49), Noël-Hume (1954: 104), Terent'ev (1965: 150), Brongersma (1966: 52; 1967a: 16; 1967b: 395; 1967c: 7; 1970a: 72), Garms (1968: 151), M. [A.] Sm[ith] & A. d'A. B[ellairs] (1967: 312): *Caretta caretta*;
 Mertens (1952, 1960b, 1964, 1968a: 24), Hellmich (1956: 88; 1962: 84), Leutscher (1966: 73): *Caretta caretta caretta*;
 M. [A.] Sm[ith] (1955: 550), Burton (1961b: 834): Loggerhead.

SCOTLAND

Ca 3, 13.xii.1945, alive, Collister Beach, West side of Unst (Shetland).
 RSM 1946.8.

Wilson (1947: 160), Taylor (1948: 11, 26; 1963, chart 8), M. A. Smith (1951, 1954, 1964, 1969: fig. 84), Brongersma (1961: 2, table I, fig. 3c, 4c): *Caretta caretta*.
 Stephen (1953: 109, 112): *Caretta caretta caretta*.

Carapace, long 219 mm, wide 196.5 mm.

Ca 4, 30.ix.1952, dead, near Stoer, Lochinver by Lairg (Sutherland);
 in the possession of Mr. Aird, Lochinver (in 1953).

Stephen (1952): Loggerhead Turtle.
 Stephen (1953: 109, 113): *Caretta caretta caretta*.
 Taylor (1963, chart 8): *Caretta caretta*.

Carapace, long 13½ inches (343 mm); the weight was given as 12 lb (5.45 kg).

Ca 5, 26.xi.1898, dead, Vallay Island (off North Uist), Outer Hebrides (Inverness).

Peel (1899: 115; 1900: 213; 1901: 4), Ritchie (1924b: 165): *Thalassochelys caretta*.
 Taylor (1948: 11, 26; 1963: chart 8), M. A. Smith (1951, 1954, 1964, 1969: fig. 84): *Caretta caretta*.
 Stephen (1953: 109, 112): *Caretta caretta caretta*.

Carapace (taken along the curve), long $6\frac{1}{4}$ inches (159 mm), wide $5\frac{3}{4}$ inches (146 mm).

Ca 6, 13.ii.1946, alive, West side of North Uist, Outer Hebrides (Inverness); presented by Mr. C. J. M. Cadzow. RSM 1946.9.

Wilson (1947: 160), Taylor (1948: 11, 26; 1963: chart 8), M. A. Smith (1951, 1954, 1964, 1969: fig. 84), Brongersma (1961: 2, table I, fig. 3d): *Caretta caretta*.

Stephen (1953: 109, 112): *Caretta caretta caretta*.

Carapace, long 180 mm, wide 160.3 mm.

Ca 7, 3.i.1960, alive, Ormaclett, South Uist, Outer Hebrides (Inverness); found by Alec McCastall, presented by Sir Walter Hungerford Pollen. BM 1960.1.1.16.

Pollen (1960), Matheson (1960: 989), Brongersma (1961: 2, table I, fig. 3g, 4m, n, 6b), Taylor (1963: chart 8): *Caretta caretta*.

Stephen (1961: 44): *Caretta caretta caretta*.

Carapace, long 248 mm, wide 211 mm; weight of preserved specimen 4 lb 11 oz. (2.13 kg).

Ca 8, ♀, 13.xii.1923, alive, Pool Roag, at the landward end of a bay opening southward into Loch Bracadale (near Dunvegan), Skye (Inverness), approx. $57^{\circ}24'30''\text{N}$, $6^{\circ}32'10''\text{W}$. RSM 1925. 101.

Ritchie (1924a: 99-103; 1924c: 166): *Thalassochelys caretta*.

Taylor (1948: 11, 26; 1963: chart 8), M. A. Smith (1951, 1954, 1964, 1969: fig. 84), Brongersma (1961: 2, table I, fig. 2b): *Caretta caretta*.

Stephen (1953: 109, 113): *Caretta caretta caretta*.

Carapace, long along curve 3 feet 5 inches (1041 mm), wide, in straight line, 2 feet $7\frac{1}{2}$ inches (800 mm); weight 309 lb. This female contained 1020 eggs, the largest of which were 28.6 mm in diameter. The barnacles and goose barnacles present on this turtle were described by Ritchie (1924c): *Chelonobia caretta* (Spengler), *Lepas hilli* (Leach), *Conchoderma virgata* (Spengler).

Ca 9, 4.xii.1961, alive, $\frac{1}{2}$ mile N of Dunure (Ayrshire). RSM 1962.11.

Anonymus (1962a: 26): Common Loggerhead.

Stephen, Rae & Lamont (1963: 37-38): *Caretta caretta caretta*.

Carapace, long 209 mm.

Ca 10, 4.xii.1951, alive, Girvan (Ayrshire). RSM 1952.1.

Stephen (1953: 110, 112): *Caretta caretta caretta*.

Brongersma (1961: 2, table I fig. 3f, 4e, 7c), Taylor (1963: chart 8): *Caretta caretta*.

Carapace, long 228 mm, wide 197 mm.

Ca 11, 29.vii.1861, alive, Greenside, near the promontory called Gamrie Mhor, about 3 miles from Macduff (Banffshire).

Edward (1861: 7713): *Testudo imbricata*.

Harvie-Brown & Buckley (1895: 231), Ritchie (1924a: 102): *Thalassochelys caretta*.

Sim (1903: 198): *Chelonia imbricata*.

Mertens (1926: 12, Banff), Stephen (1953: 109, 111): *Caretta caretta caretta*.

Taylor (1948: 11, 26), M. A. Smith (1951, 1954, 1964, 1969: fig. 84): *Eretmochelys imbricata*.

Carapace, long 15 inches (381 mm), wide 10 inches (254 mm). The turtle was caught in a stake-net. The specimen was sent to the Burgh Museum, Banff, but is no longer extant. A small turtle, presumably this specimen, was (unfortunately) destroyed in 1952 (Stephen, 1953: 111). Edward (1861: 7714) wrote: "Above the shell is of a fine mahogany colour, with lightish streaks or veins throughout the whole of the plates, which give it a marbled appearance. The animal itself, or at least that portion of its skin which is seen from above, is mostly of a brownish tint; underneath it is altogether of a most beautiful yellow, as also are the sides of the neck."

From this description it is clear that the specimen was a Loggerhead and not Kemp's Ridley.

Ca 12, 1.viii.1861, alive, Pennan (Aberdeenshire).

Edward (1861: 7715): *Testudo imbricata*.

Dyce (1861), Sutherland (1861): *Chelonia caretta*.

Van Lidth de Jeude (1895a: 211), Gadow (1901: 387: Penman, Banffshire), Ritchie (1924a: 102): *Thalassochelys caretta*.

Editors (postscript to Peel, 1899): *Thalassochelys caretta*.

Sim (1903: 197): *Chelonia imbricata*.

Mertens (1926: 12), Taylor (1948: 11, 26; 1963: chart 8), M. A. Smith (1951, 1954, 1964, 1969: fig. 84): *Caretta caretta*.

Stephen (1953: 109, 111): *Caretta caretta caretta*.

Carapace, long 19½ inches (495 mm), wide 18 inches (457 mm); weight ca. 25 lb (ca. 11.4 kg).

The turtle was caught in a salmon-net. It was sent to the Natural History Department of Aberdeen University. It may be an unlabelled specimen with the carapace 17 inches (ca. 432 mm) long that is still present in the Aberdeen University Museum (Stephen, 1953: 111).

Dyce (1861: 351) describes the colour as deep brown, streaked and spotted

with yellow. This, together with the other features mentioned in the description make it clear that the specimen was truly a Loggerhead.

ENGLAND

Ca 13, ♂, ca. 3.x.1927, alive, River Lune at Aldcliffe (Lancashire). BM 1929.12.3.1, received from Mr. H. W. Robinson.

"The Guardian", 8.x.1927, fig.

Coward (1927: 13; 1930: 17), Bayliss (1928: 332), H. W. Parker (1946: figure of adult): *Thalassochelys caretta*.

Charnley (1936: 129): Loggerhead Turtle.

E. Hardy (1947): Turtle.

Taylor (1948: 11, 26; 1963: chart 8), Ellison (1959: 28): *Caretta caretta*.

Carapace, long 908 mm (along curve, 965 mm), wide 712.5 mm (along curve 876 mm).

Although a number of specimens had been recorded already from Great Britain, Coward (1927: 13) reported it to be new to the British list. E. Hardy (1947) stated: "There is a report of a loggerhead turtle in the estuary of the river Lune in October, 1927, but from a most unreliable recorder now deceased." The report in "The Guardian", and the specimen in the British Museum (Natural History) show that the recorder was not as unreliable as E. Hardy assumed.

"The Guardian" of Saturday, October 8th, 1927, stated that after a gale a turtle was washed ashore on the bank of the river Lune at Aldcliffe. Many people went to see it on Monday (i.e., October 3rd); it was placed in a large pool to keep it alive. On Tuesday (i.e., October 4th) it was taken away to Lancaster by some boys, who wanted to exhibit it. Miss Dawson, of Aldcliffe Hall, on whose land the turtle was stranded, reclaimed it with the intention to send it to the Edinburgh Aquarium. According to the caption of a photograph of the turtle in the same newspaper, it died on Friday (i.e., October 7th), and it was sent to the British Museum (Natural History). The newspaper report gives the length as being about 42 inches (ca. 107 cm), and this will have been the total length.

Baylis (1928: 332) mentions the Trematode Worm *Orchidasma amphiorchis* (Braun) from this turtle.

Ca 14, Irish Sea, 1810 or 1816; Yorkshire Museum, carapace only.

Carapace, long 564 mm, wide 504 mm. There are five vertebral scutes and five pairs of costal scutes; on each side twelve marginals. Most of the horn of the scutes has become worn off; the remnants still present are reddish-brown in colour.

[Continuation of English Loggerhead records, see Ca 19.]

WALES

Ca 15, viii.1962, alive, W. coast of Anglesey.

Mr. P. M. A. Plews (in litt., 8.xi.1967).

Ca 16, ix.1964, alive, W. coast of Anglesey.

Mr. P. M. A. Plews (in litt., 8.xi.1967).

This turtle had become entangled in a net, but it dropped out before Mr. Plews could get it on board.

Ca 17, 11.xii.1938, alive, Tenby (Pembrokeshire).

Heron-Allen (1938), H. W. Parker (1939a: 121; 1939b: 128), Taylor (1948: 11, 26; 1963: chart 8), M. A. Smith (1951, 1954, 1964, 1969: fig. 84), Matheson (1960: 989): *Caretta caretta*.

"West Wales Weekly Observer", 16.xii.1938 (not seen but quoted in the issue of 13.i.1967: 5, col. 6): **turtle**.

"The Times", 16.i.1939: 9, col. 4: Common Loggerhead.

Mr. G. Hodges (in litt., 31.i.1967).

The turtle was first observed swimming along the shore line on December 10th, 1938; it came ashore the next day (Mr. G. Hodges, in litt.). It was taken to the home of Mr. J. Hodges, and still alive it was taken to the Norton Hotel on the evening of December 12th, to be used for preparing turtle soup.

Total length, 4 feet 9¾ inches (1467 mm); width, 2 feet 7½ inches (800 mm). The "West Wales Weekly Observer" gives the weight as having been estimated to be nearly 60 lb.; a note in the Stranded Turtles File gives the weight as 61¼ lb. (27.8 kg.). I found it hard to believe that a Loggerhead of this size would weigh only so little, especially as other specimens of more or less comparable size have been reported to have weighed much more (e.g., Ca 59: 616 lb.; Ca 8: 309 lb.; Ca 20: ca 200 lb.). However, Mr. G. Hodges, as a thirteen year old boy, took the turtle to the hotel on a small hand truck and this would suggest that it was not all that heavy. "Its right front flipper was missing and had been for some time by the look of the remaining stump. It was in a very lethargic condition" (Mr. G. Hodges, in litt.).

Ca 18, 7.ii.1946, alive, Oxwich Beach (Glamorgan). National Museum of Wales 46-54.

Wilson (1947: 160), Taylor (1948: 11, 26; 1963, chart 8), M. A. Smith (1951, 1954, 1964, 1969: fig. 84), Matheson (1960: 989): *Caretta caretta*.

Carapace, long 404 mm, wide 343 mm; weight 8.180 kg (Matheson, 1960: 989).

The left fore flipper is missing; the second inframarginal on the right

side is divided, making apparently four inframarginals (notes by Dr. H. W. Parker).

ENGLAND (continued)
(see also Ca 13 - Ca 14)

Ca 19, xi.1958, dead, Saunton Sands (Devon).

Taylor (1963: chart 8): *Caretta caretta*.

Carapace, long (along curve) 35½ inches (901 mm), wide (along curve) 33 inches (838 mm).

Ca 20, 28.i.1840, alive, mouth of the River Tow, about ½ mile from Instow (Devon).

Wilcox (1840: 136-138: "mouth of the River Tor, about ½ mile of the village of Inslow"): *Testudo caretta*.

Gray (1847: 133; 1855: 73; 1873a: 91): *Caouana caretta*.

Strauch (1865: 146): *Thalassochelys corticata*.

G. A. Boulenger (1889: 185, specimen e, Coast of Devonshire, W. Wilson), Harvie-Brown & Buckley (1895: 231): *Thalassochelys caretta*.

Taylor (1948: 10, 26), M. A. Smith (1951, 1954, 1964, 1969: fig. 84): *Caretta caretta*.

Total length 4 feet 5 inches (1346 mm), length of "dorsals and marginals" (i.e., length of carapace) 2 feet 11 inches (889 mm), width of "dorsals and marginals" (i.e., width of carapace) 2 feet 9 inches (838 mm); weight ca. 200 lb. (90.9 kg).

The original locality record by Wilcox (1840) escaped the notice of Taylor (1948: 10), and of M. A. Smith (1951, 1954, 1964, 1969), who, not knowing whether the turtle had been found in North or South Devon, marked it on their charts (Taylor, 1948: 26; Smith, 1951, 1954, 1964, 1969: fig. 84) on the South coast of Devonshire; it is not indicated by Taylor (1963) on his chart 8.

Although the identification of this specimen has not been checked, its size and weight definitely point to its being a Loggerhead.

Ca 21, 25.viii.1945, alive, Crooklets Beach, Bude (Cornwall), leg. A. E. Jewell.

H. W. Parker (1946: 634, fig.): *Thalassochelys caretta*.

Wilson (1947: 160), Taylor (1948: 10, 26; 1963: chart 8), M. A. Smith (1951, 1954, 1964, 1969: fig. 84), Turk & Penhallurick (1966: 6): *Caretta caretta*.

Anonymus (1962c: 326, fig.): *tartaruga caretta*.

Hillaby (1963: fig. 1): Atlantic ridley (lapsus).

Carapace, long 200 mm, wide 180 mm.

Ca 22, 15.xi.1970, alive, Perranporth (Cornwall) (Pl. 9).

Mr. R. D. Penhallurick (in litt., 16.xi.1970, and 10.v.1971).

The turtle was washed ashore alive. "It was seen to be "attempting to dig into the sand" and about to "give birth" as something queer was hanging from its underside! — this turned out to be three specimens of *Lepas anatifera*. No doubt its digging action was nothing more than its usual attempt at propulsion on land".

The turtle was kept alive for about one month by Mr. K. Jones, of St. Agnes, who preserved the specimen after it had died.

I am very grateful to Mr. Penhallurick and Mr. Jones for sending me the preserved specimen on loan.

Carapace, long 205 mm, wide 176 mm.

Five pairs of costals and five vertebrae. The vertebrae are strongly keeled, and the keels of the first and second vertebrae end in a spiny process; that at the end of the keel of the third vertebral is more knob-like. The second, third, and fourth costals are keeled. Thirteen marginals on either side. Three inframarginals on each side; on the right side a small part of the third inframarginal has become separate from the main scute, but this small additional scute does not reach the abdominal scute. There are no inframarginal pores. There is a small intergular. Two pairs of prefrontals, with a large azygous, lozenge-shaped scale wedged in between them. Three inframandibular scales in a row, with a row of smaller scales above them.

Ca 23, 7.viii.1945, alive, taken at sea, off Hayle (Cornwall), leg. S. J. Thomas.

Wilson (1947: 160), Taylor (1948: 10, 26?; 1963: chart 8), M. A. Smith (1951, 1954, 1964, 1969: fig. 84?), Turk & Penhallurick (1966: 6): *Caretta caretta*.

Carapace, long 185 mm, wide 165 mm.

Ca 24, 10.viii.1945, alive, washed ashore at Gwythian Sands, Hayle (Cornwall), leg. Richard Buckner.

Wilson (1947: 160), Taylor (1948: 10, 26?; 1963: chart 8), M. A. Smith (1951, 1954, 1964, 1969: fig. 84?), Turk & Penhallurick (1966: 6): *Caretta caretta*.

Carapace, long 200 mm, wide 165 mm.

On their charts, Taylor (1948: 26) and M. A. Smith (1951, 1954, 1964, 1969: fig. 84) indicate but one Loggerhead for the Hayle area. Whether this is the one mentioned here under Ca 23 or under Ca 24, I do not know. Taylor (1963: chart 8) indicates both records. Ca 21, 23, 24 were sent to Paignton Zoo; at the time no records were kept there, and it is not known

what happened to the specimens (Mr. A. P. G. Mickelmore, in litt., 13.ix.1965).

Ca 25, 12.ii.1950, alive, Trevail Cove, Zennor (Cornwall). BM 1950. 1.4.59.

Brongersma (1961: 2, table I), Taylor (1963: chart 8), Turk & Penhallurick (1966: 6): *Caretta caretta*.

Carapace, long 186 mm, wide 160 mm.

The turtle was found by Mr. John Loosemore, of Trevail Farm, Zennor; it was sent alive to the Marine Biological Laboratory, Plymouth, and after it died it was presented to the British Museum (Natural History).

Ca 26, 1936, alive, Porthloo Beach, St. Mary's (Pl. 8).

Mr. P. Z. Mackenzie (in litt., 15.xi.1965).

The turtle was found by Mr. Jack Burnett; it was kept alive for some days in a tub of sea water; the shell was about 10 inches (254 mm) long.

A photograph made by F. E. Gibson shows a turtle with five strongly keeled vertebrals; the keel of the second and third vertebrals ending in a compressed knob. Five pairs of costal scutes, keeled; on the right side thirteen marginals (the marginals of the left side cannot be counted in the photograph).

Although it is difficult to make an identification from a photograph, especially when this has not been taken perpendicularly to the dorsal surface, I am convinced that the Porthloo turtle was a Loggerhead.

Ca 26 bis, ♀, summer of 1955, dead, Mousehole (Cornwall). County Museum, Truro, incomplete carapace.

Mr. R. D. Penhallurick (in litt., 7.viii.1971), Mr. R. D. Carswell (in litt., 24.viii.1971), Mrs. D. M. Carswell (in litt., ix.1971).

The turtle together with a smaller one (Un 32) was found floating just offshore, at about 300-400 yards north of Mousehole. It was found by Messrs. D. B. & R. D. Carswell, who preserved the carapace, which was shown at various exhibitions at Mousehole. It was in good condition two years ago, since when it has been left out of doors. At present the carapace is in poor condition, it having desintegrated partly. The nuchal bone, the left first four costal bones, and most of the marginal bones (except the last four on the left and the last five on the right) have been lost.

There are nine neural bones, and these form a continuous series, separating the left costal bones from those on the right side. Each pair of costal bones is separated by two neural bones, viz., the costals of the first pair are separated by the first and second neurals, those of the second pair by the second and

third neurals, etc. Of the horny scutes, the greater part of the right third and fourth costal scutes and part of the fifth vertebral scute have been preserved. The colour of these scutes, which are much weathered, is a dull greyish-brown. However, when part of the fifth vertebral was cleaned a reddish-brown colour became visible, and this agrees well with the "warm brown" colour mentioned by Mrs. Carswell.

This colour, and the feature of two neurals separating each pair of costal bones, definitely point to this turtle being a Loggerhead. In *Lepidochelys* one or more pairs of costal bones are separated by three neurals (cf. Deraniyagala, 1939c: table xii, figs. 60, 61, 62; Pritchard, 1969a: fig. 19).

From memory Mr. R. D. Carswell estimated the length of the carapace to have been between 25 and 28 inches (635-711 mm). This estimate seems to be somewhat too high. The length of the part of the carapace that has been preserved, from the anterior border of the first neural to the posterior tip of the last marginal is 438 mm. To this must be added the median length of the nuchal bone and the thickness of the scutes covering the nuchal and last marginal bones. From comparison to other carapaces I estimate that to the measurement of 438 mm about 40 mm should be added. In this way the length of the complete carapace would have been about 480 mm, say 500 mm at most. The lengths of the second and third vertebrae can be measured from the grooves on the neural bones; the width of these scutes can only be estimated by measuring half the width, from the groove on the costal bones to the centre of the neural bone, and then doubling this value. Measured and estimated in this way the second vertebral was 104 mm long and about 80 mm wide, and the third vertebral 99.5 mm long and about 90 mm wide. Comparison of these measurements to those given in table 12 also makes it likely that the length of the carapace would be in the order of 500 mm. The first and third neural bones still show a trace of a keel, which exteriorly will have been visible on the first and second vertebrae. The presence of traces of keels on these vertebrae is also in agreement with a carapace length of about 500 mm. That the specimen is not an old one is clear from the presence of well-marked fontanelles between the costal bones on the one side and the marginal bones on the other side.

Mrs. Carswell writes: "The one we had, had eggs inside it. The shells of these eggs were soft like a skin". It is not stated how large the eggs were; in a specimen of this size they must have been fairly small ovarian eggs.

The exact date upon which the turtle was found is not known. Mr. D. B. Carswell places the event in July-August, 1955. Mrs. Carswell writes: "It must have been during the school holidays and the weather was very warm because the turtle soon became very "off". Therefore it was either Whit-

suntide or August. I rather think it was before August though." In 1955 Whitsunday was May 29th, and this would not fit the months which Mr. Carswell had in mind. Mr. Carswell adds that the wind was South East, and that many Portuguese Men o'War were washed in that summer. It may be remembered that Sir Alister Hardy (1956: 118, note 1; Turk & Penhallurick, 1966: 4) reported an invasion of Portuguese Men o'War for 1954, and one wonders whether the turtles could not have been found in 1954 instead of in 1955.

Ca 27, ix.1896, alive, about 8 miles SSE of Mousehole (Cornwall).

J. Clark (1906: 307): *Thalassochelys caretta*.

Heron-Allen (1938): Loggerhead.

Taylor (1948: 10, 26; 1963: chart 8), M. A. Smith (1951, 1954, 1964, 1969: fig. 84), Turk & Penhallurick (1966: 6): *Caretta caretta*.

Weight 120 lb. (54.5 kg.).

I have not been able to trace the source from which Clark (l.c.) took this record.

Ca 28, 5.xii.1953, alive (or just dead), Gar Tul Point, Porthleven (Cornwall).

"The Western Morning News", 8.xii.1953 (not seen).

Venables (1954): Turtle.

Taylor (1963: chart 8): *Eretmochelys imbricata*.

Turk & Penhallurick (1966: 6): *Caretta caretta*.

Carapace, long 9 inches (228.5 mm), wide 8½ inches (220 mm).

The turtle was found by Mr. W. Richards, from whom it passed to Mr. F. E. Strike, Porthleven.

Originally the turtle was stated to have been of the "hawksbill type", and this has caused its having been recorded as *Eretmochelys imbricata* by Taylor (1963: chart 8). Mr. F. E. Strike first tried to clean the shell, but eventually he buried it in his garden. It was exhumed and examined by Mr. B. H. Sargent, F.R.E.S., Porthleven, who identified it as a Loggerhead. It had five pairs of costal shields, three pairs of inframarginals without pores (letter from Mr. Sargent to Dr. H. W. Parker, d.d. 26.xii.1953). When still unaware of the fact that it had been exhumed and identified already, I asked Mr. Strike to dig it up, but as it had fallen to pieces, the specimen could not be saved.

Ca 29, 18.xii.1938, dead, between Charmouth and Lyme Regis (Dorsetshire).

"The Times", 16.i.1939: 9, col. 4; H. W. Parker (1939a: 121; 1939b: 127): unidentified.

Taylor (1948: 10, 26; 1963: chart 8), Dalton (1951: 135), M. A. Smith (1951, 1954, 1964, 1969: fig. 84): *Caretta caretta*.

At first recorded as an unidentified turtle, the skull was later examined by Dr. H. W. Parker, who identified it as a Loggerhead. In his letter of January 1st, 1939, Mr. B. P. Legge stated the shell to be about 8 inches (203 mm) wide; it was much damaged. The skull was preserved by Mr. Legge.

Ca 30, ♀, 7.vii.1899, alive, on the shore between Porchfield and Newton, Isle of Wight (Hampshire).

Poole (1900: 77): Hawk's=bill Turtle.

Wadham (1909: 496): *Thalassochelys caretta*.

Mr. Percy Wadham, of Newport, Plumassier & Naturalist to the Royal Family, kept the turtle alive until November 4th, 1909, by feeding it raw meat. In January 1909 the specimen was sent to Dr. G. A. Boulenger, British Museum (Natural History) for identification (letters by P. Wadham, 21.i. and 27.i.1909). Boulenger being absent apparently, the identification was made by Dr. C. Tate Regan, who wrote "*Thalassochelys caretta*" on the back of one of Wadham's letters. As Wadham (1909: 496) states that the turtle showed overlapping shields, a feature characteristical of the Hawksbill, and not of the Loggerhead, some doubt was cast on Regan's identification. As far as could be ascertained the preserved specimen was in the possession of Mr. Poole, of Shanklin. After his death his collection passed into the possession of the municipality. During the war the museum was bombed, and the specimen must be considered lost. Correspondence with members of the Wadham family brought to light a photograph of this turtle, in the possession of Mr. W. Wadham, of Seaview. It shows a turtle with five pairs of costal shields, and this excludes its being a Hawksbill. The remark about the overlapping shields may be based upon the fact that the knobs at the end of the keels on the vertebral shields extend slightly backwards above the following shield. There is no trace, however, of the shields of the carapace truly overlapping. Although it is difficult to make an identification from a photograph, the general shape of the specimen makes me conclude that it was a Loggerhead and not Kemp's Ridley.

Wadham states the length (carapace?) to have been 1 ft (305 mm), width 8 inches (203 mm).

Ca 31, ca. 18.xi.1938, alive, opposite the Old Mill, Selsey Bill (Sussex). BM 1940.3.15.1.

Heron-Allen (1938), H. W. Parker (1939a: 121; 1939b: 127), Taylor (1948: 10,

26; 1963: chart 8), M. A. Smith (1951, 1954, 1964, 1969: fig. 84), Brongersma (1961: 2, table 1): *Caretta caretta*.

"The Times", 16.i.1939: 9, col. 4: Common Loggerhead.

Carapace, long 202 mm, wide 174 mm.

Ca 32, 16.xii.1938, alive, near the pier at Bognor Regis (Sussex).
BM 1940.3.17.1.

"The Times", 16.i.1939: 9, col. 4: Common Loggerhead.

H. W. Parker (1939a: 121; 1939b: 127), Taylor (1948: 10, 26; 1963: chart 8), M. A. Smith (1951, 1954, 1964, 1969: fig. 84): *Caretta caretta*.

Carapace, long 641 mm, wide 512 mm.

A cluster of goose-barnacles was attached to the plastron. The right fore flipper had been amputated, but the wound had healed. The turtle was sent to the Brighton Aquarium, where it was found that it could only swim in circles. After it died it was presented to the British Museum (Natural History).

Ca 33, 11.xii.1938, alive, Felpham (Sussex), taken by Peter Hoff. BM 1940.3.16.1.

"Daily Mirror", 13.xii.1938 ("From the South Seas-of Britain"), fig.; "Daily Telegraph & Morning Post", 13.xii.1938 ("The Odd Spot"): turtle.

Heron-Allen (1938), H. W. Parker (1939a: 121; 1939b: 127), Taylor (1948: 11, 26; 1963: chart 8), M. A. Smith (1951, 1954, 1964, 1969: fig. 84): *Caretta caretta*.

"The Times", 16.i.1939: 9, col. 4: Common Loggerhead.

Carapace, long 512 mm, wide 431 mm; part of the left fore flipper is missing, but the wound has healed.

The turtle was found by Peter Hoff, whilst it moved under a heap of seaweed. The "Daily Mirror" gives the weight as being 50 lb. (ca. 22.7 kg), the "Daily Telegraph & Morning Post" states the weight to have been 35 lb. (ca. 15.9 kg).

Ca 34, 9.xii.1954, alive, Rustington, near Littlehampton (Sussex).

Mr. E. M. Venables (in litt., 10.xii.1954).

Taylor (1963: chart 8): *Caretta caretta*.

Ca 35, v.1854, alive, North Sands, Scarborough (Yorkshire). Wood End Museum, Scarborough.

W. J. Clarke (1911: 305, fig.): *Thalassochelys caretta*.

Rimington (1956: 371): *Caretta caretta*.

The first identification was made by Dr. G. A. Boulenger from a photograph sent to him. The identification has been checked by Mr. C. I. Massey, of the Wood End Museum. The specimen has five pairs of costals, three

inframarginals without pores on either side; colour of carapace: reddish brown.

Carapace, long 450 mm, wide 388 mm.

CHANNEL ISLANDS

Ca 36, ♀, xii.1954, dead, St. Ouen's Bay, Jersey. Jersey Museum.

Le S[ueur] (1955a): Loggerhead.

Le Sueur (1955b: 267; 1961: 42), Taylor (1963: chart 8): *Caretta caretta*.

Total length 11½ inches (292 mm).

Carapace, long 185.5 mm, wide 171.2 mm.

Ca 37, 21.ii.1960, dead, Le Grouin Point, St. Brelade's Bay, Jersey. Jersey Museum.

"Jersey Weekly Post", 5.iii.1960.

Le Sueur (1961: 42): *Caretta caretta*.

Anonymus (1966a: x): Sea Turtle.

At the time the specimen was returned to the finder, Miss Susan Gough, who recently presented it to the Jersey Museum.

Carapace, long 217 mm, wide 181 mm.

Ca 38, 5.ii.1955, dead, St. Aubin's Bay. BM 1955.1.1.18.

Mr. R. F. Le Sueur (in litt, 5.ii.1955).

Brongersma (1961: 2, table I): *Caretta caretta*.

Carapace, long 190.5 mm, wide 169.5 mm.

Ca 39, 16.xi.1950, alive, La Mare Slipway, Jersey.

"The Evening Post", Jersey, 17.xi.1950, fig.: *Chelonia imbricata*.

Le Sueur (1951: 314): *Caretta kempi*.

Le S[ueur] (1955a): Loggerhead.

Le Sueur (1961: 42), Brongersma (1967a: 16): *Caretta caretta*.

Taylor (1963: chart 8): *Eretmochelys imbricata*.

Weight 2 lb. (ca. 0.9 kg). The weight of two bunches of goose-barnacles (2¾ lb., or ca. 1.25 kg) attached to the turtle's back made that this could float upside down only (Mr. H. J. Baal in a letter to Mr. J. C. Battersby). The turtle was sent alive to the Aquarium of the Zoological Society of London.

IRELAND

The occurrence of *Caretta caretta* in Irish waters is mentioned by Ingle & Smith (1949: 15).

NORTHERN IRELAND

Ca 40, 7 and 8.viii.1945, alive, River Bann near Castlerock (Co. Londonderry). Belfast Museum.

Stendall (1945: 307-308), Praeger (1950: 206), Taylor (1963: chart 8): *Caretta caretta*.

According to the "Belfast Telegraph" of August 13th, 1945, this turtle was washed-up at Castlerock, and was found propelling itself along the strand. It was put back into the water, but the heavy sea placed it again on the beach; then it was carried to the pier and dropped into the water of the mouth of the Bann. The next day it was captured by Captain B. F. M'Corkell, of Londonderry, as it was swimming in the River Bann between the breakwaters near Castlerock.

Carapace, long 13 inches (330 mm).

EIRE

Ca 41, v.1838, Donegal (no exact locality mentioned).

Thompson (1840a: 8; 1840b: 406): *Chelonia caouana*.

Thompson (1856: 61): Loggerhead Turtle.

Praeger (1950: 206), Taylor (1963: chart 8): *Caretta caretta*.

Ca 42, 7.iv.1890, alive Mullaghmore, Donegal Bay (Co. Sligo). NMI 73: 1890.

Scharff (1921: 30): *Thalassochelys caretta*.

J. S. Jackson (in litt., 24.ix.1965): *Caretta caretta*.

Carapace, long 204 mm, wide 184 mm. Four inframarginals on the left, and three on the right (J. S. Jackson, in litt.).

Ca 43, 17.ix.1938, alive, Annagh Head, The Mullet (Co. Mayo). NMI 104: 1938.

Anonymus (1939d), Praeger (1950: 206), Taylor (1963: chart 8): *Caretta caretta*.

Ca 44, 16.v.1935, Blacksod Bay (Co. Mayo). NMI 75: 1938.

Deraniyagala (1938a: 66, 69, fig. 2), Praeger (1950: 206), Taylor (1963: chart 8): *Caretta caretta*.

Deraniyagala (1952: 57): *Caretta caretta gigas*.

Carapace, long 222 mm, wide 188 mm; the right fore flipper is missing (J. S. Jackson, in litt., 24.ix.1965).

Ca 45, 2.xi.1957, alive, 300 yards of Dooagh Pier, Achill Island (Co. Mayo).

Taylor (1963: chart 8): *Caretta caretta*.

Mr. J. P. Jackson, in his letter of December 9th, 1957, sent the following information to the British Museum (Natural History).

Carapace, long 12 inches (305 mm), wide 9 inches (228 mm); weight 6½ to 7 lb. (2.95-3.18 kg). The turtle was found by Charles O'Malley, of Dooagh; it was in good state, and still vigorous enough four days later. In his letter of September 24th, 1965, Mr. Jackson writes: "The Dooagh Pier specimen . . . was, I believe, returned to the sea again".

Ca 46, 16.iii.1926, Inishmore, Aran Is. (Co. Galway). BM 1926.5.7.1, presented by S. Meskill.

Taylor (1948: 11, 26; 1963: chart 8), M. A. Smith (1951, 1954, 1964, 1969: fig. 84), Brongersma (1961: 2, table I, fig. 4*k,l*, 5*b,d*, 7*b*, 8*a*): *Caretta caretta*.

Carapace, long 198.5 mm, wide 169.5 mm.

On their charts, Taylor (1948: 11), and M. A. Smith (1951, 1954, 1964, 1969: fig. 84) placed this record too much to the north-west; it is indicated in its correct position by Taylor (1963: chart 8).

Ca 47, ix.1944, alive, Galway Bay. NMI 11: 1945.

Deraniyagala (1952: 57): *Caretta caretta gigas*.

J. S. Jackson (in litt., 24.ix.1965): *Caretta caretta*.

Carapace, long 174 mm, wide 146 mm.

Ca 48, 1945?, Tralee (Co. Kerry). NMI 39: 1945.

Deraniyagala (1952: 57): *Caretta caretta gigas*.

Ca 49, date unknown, but in the 1930-1950 period, Valentia Island. NMI.

J. S. Jackson (in litt., 24.ix.1965): *Caretta caretta*.

Carapace, long 229 mm, wide 211 mm.

Ca 50, late xii.1945, alive, Sherkin Island (Co. Cork).

Freeman (1946): *Caretta caretta*.

Carapace, long 7½ inches (190 mm), wide 6½ inches (165 mm), total length 11¼ inches (286 mm); weight 2 lb. 7½ oz. (1.119 kg).

See also Uca 3.

Ca 51, 22.iv.1957, dead, in the close vicinity of the Seven Heads, (i.e., on the coastline halfway between Courtmacsherry Bay and Clonakilty Bay (Co. Cork).

L. S. Atkins (in litt., 23.iv.1957: three inframarginals, no pores).

Length (total?) 24 to 26 inches (610-660 mm); weight in the neighbourhood of 50 lb. (22.73 kg).

Ca 52, date?, alive, Youghal (Co. Cork).

Thompson (1840a: 8; 1840b: 383): *Chelonia caouana*.

Thompson (1856: 61): Loggerhead Turtle.

Taylor (1948: 10, 26; 1963: chart 8), Praeger (1950: 206), M. A. Smith (1951, 1954, 1964, 1969: fig. 84): *Caretta caretta*.

The locality record is indicated too much to the West by Taylor and M. A. Smith.

Ca 53, x.1953, alive, Ballyteigue Strand, Kilmore Quay (Co. Wexford).
NMI 2: 1955.

J. S. Jackson (in litt., 24.ix.1965): *Caretta caretta*.

Carapace, long 610 mm, wide 533 mm.

Ca 54, date?, Irish Coast. NMI.

J. S. Jackson (in litt., 24.ix.1965): *Caretta caretta*.

Carapace, long 201 mm, wide 173 mm.

DENMARK

Ca 54 bis, 4.xi.1971, alive, Ulfshale, island of Møen.

"Berlingske Tidende", 8.x.1971.

Dr. Arne Schiøtz (in litt., 25.x.1971).

A live young Loggerhead came ashore on the Danish island of Møen, and it was sent to Danmarks Akvarium at Charlottenlund. It is the first Loggerhead to be recorded from Denmark and the second from the Baltic Sea (for the other one see Ca 55).

Carapace, long 26 cm, wide 22 cm (Dr. A. Schiøtz, in litt.).

A note about this specimen will be published by Dr. Arne Schiøtz.

POLAND

Ca 55, 8.xi.1835, alive, Zoppot (near Danzig = Gdansk).

Von Siebold (1837: 495-496): *Testudo caretta*.

Wiegmann (1838: 363-364): *Chelonia cauana*.

Strauch (1865: 146): *Thalassochelys corticata*.

Mertens (1968a: 24): *Caretta caretta caretta*.

This Loggerhead stranded alive near Zoppot, Germany (now: Poland); von Siebold, who examined and dissected the specimen, states that the stomach and the intestine were empty, and that the turtle had only little fat. He sup-

posed that it was brought to the Baltic by ship. This is of course possible, but it is more likely, in my opinion, that the turtle got there by its own effort. The fact that the fat had been practically used up, is more in favour of the assumption that the turtle used much energy in swimming. Von Siebold refers to an earlier issue of the same journal ("Preussische Provinzial Blätter"), in which it had been mentioned that a turtle had been captured on the beach of Zoppot in the spring of 1836, and he assumes (probably correctly) that the present specimen is meant, but that the date has been changed erroneously.

THE NETHERLANDS

The occurrence of the Loggerhead in the Netherlands has been mentioned by:

- Van Lidth de Jeude (1895b: 110): *Thalassochelys caretta*;
 Maitland (1897: 16): *Chelonia caretta*;
 Van den Brink (1943: 16), Mertens (1952, 1960b, 1964, 1968a: 24), Hellmich (1956: 88; 1962: 84), Leutscher (1966: 73): *Caretta caretta caretta*;
 IJsseling & Scheygrond (1948: 65; 1952, 1957: 67; 1962: 77), Terent'ev (1965: 150), Brongersma (1937: 651; 1953: 469; 1970a: 16): *Caretta caretta*.

Ca 56, 22.xii.1954, dead, Noordwijk, received from Mr. P. de Groot. RMNH 10674.

Brongersma (1961: 2, 12, fig. 5c): *Caretta caretta*.

Carapace, long 205.5 mm, wide 170 mm.

Ca 57, x.1959, dead, beach N of Noordwijk. RMNH 11480.

Of this turtle I have seen only one costal bone (the fifth of the right side); this was found by Mr. W. Lubbers, who presented it to the Rijksmuseum van Natuurlijke Historie, Leiden. Comparison to skeletons in the British Museum (Natural History), London, convinced me that this bone derived from a Loggerhead. No stranding of a turtle has been reported at the time, and the specimen may have desintegrated at sea, somewhere off the Dutch coast, but probably not very far away, because the bone is not much worn.

Ca 58, 1927, alive, Scheveningen.

Van Kampen & Heimans (1927: 50): *Thalassochelys caretta*.

Mertens (1938: 2), Brongersma (1961: 10, fig. 1): *Caretta caretta*.

I am greatly indebted to the late Dr. A. B. van Deinse, Rotterdam, and to the Municipal Archives, The Hague, for information that led to tracing the finder of this turtle. It was found alive on the beach by Mr. J. Lagerwaard, who describes it to have been as large as a fairsized crab (hence, about 250 mm

long), and reddish in colour; one flipper was missing. Mr. Lagerwaard presented the turtle to the Zoological Gardens at The Hague, but these no longer being extant, it was impossible to trace the date upon which the turtle was received. It is not known how long the turtle lived in the aquarium, nor what became of the specimen afterwards.

Ca 59, ♀, ca. 27.xii.1894, alive, 500 m West of the harbour of Ouddorp, island of Overflakkee, leg. C. de Kluijver, purchased of J. de Kluijver (9.i.1895). RMNH 10671.

Van Lidth de Jeude (1895a: 211, 212), Gadow (1901: 387), Scharff (1921: 30), Van Kampen & Heimans (1927: 50), Holthuis (1952: 76-77): *Thalassochelys caretta*.

Jentink (1895: 12): *Testudo emys* (sic!).

Jentink (1896: v): Caretschildpad.

Mertens (1926: 12), Brongersma (1961: 2, 10, 12, 16, table I, fig. 1, 3a, 4b): *Caretta caretta*.

After the storm surge, which swept the coast of the island of Overflakkee on December 22nd-23rd, 1894, the seawall had to be repaired. Mr. J. de Kluijver was in charge of these repairs, and he employed his son, Mr. C. de Kluijver (then fourteen years old) as a messenger. As Mr. C. de Kluijver writes me (letter of September 29th, 1965) he was not a success as such, because when sent out on an errand he found the turtle, and he forgot his errand in trying to push the turtle up the embankment. After the turtle had died, the local physician treated it with a preservative to avoid decomposition. It was exhibited at Ouddorp, Sliedrecht, Dordrecht, and Rotterdam. In Rotterdam it was shown for a very short time only, because such a crowd collected that the police forbade further exhibition. It arrived at Leiden on January 9th, 1895, and was purchased for 53.50 guilders. Mr. C. de Kluijver places the date of his finding the turtle at about December 27th, 1894.

Van Lidth de Jeude (1895a: 211, 212) published a short note on this turtle; Holthuis (1952: 76-77) described the barnacles found on its carapace: *Chelonibia caretta* (Spengler), *Platylepas hexastylus* (O. Fabricius).

How Jentink (1895: 12) came to include this turtle as *Testudo emys* in his annual report remains a mystery. Scharff (1921: 30) erroneously mentions this turtle as having been found in Belgium.

Carapace, long 965 mm, wide 765 mm; weight 280 kg. This female contained 1150 eggs; the largest of these were 35 mm in diameter, weighing 17.5 gr; the smaller eggs had a diameter of 25 mm, and weighed 11 gr.

BELGIUM

The occurrence of the Loggerhead on the Belgian coast is mentioned inter alia, by:

Maitland (1897: 16), Hannon (n.d.: 13): *Chelonia caretta*;
 Gadow (1901: 387): *Thalassochelys caretta*;
 De Witte (1948: 230), Mertens (1952, 1960b, 1964, 1968a: 24), Hellmich (1956: 88;
 1962: 84), Leutscher (1966: 73): *Caretta caretta caretta*;
 Brongersma (1967a: 16): *Caretta caretta*.

Ca 60, Ca 61, date?, Blankenberge.

De Selys-Longchamps (1842: 171): *Chelonia caretta*.
 Van Lidth de Jeude (1895a: 211): *Thalassochelys caretta*.
 Mertens (1926: 12): *Caretta caretta*.

De Selys-Longchamps (l.c.) mentions that the Loggerhead had been captured twice at Blankenberge, but no further information about the specimens is given.

FRANCE

The occurrence of *Caretta caretta* in French Atlantic waters is mentioned, inter alia by:

Goldsmith (1840, 1862: 342, note; n.d. *b, c*: 317, note 2): *testudo caretta*;
 Chenu & Desmarest (1836: 39): *Chelonia caouanna*;
 Larousse (1867: 1123): chelonée caouanne;
 Figuier (1869: 178): *C[helonia] caouana*;
 Gervais (1871: 469): caouannes;
 Taslé (1872: 178): Chelonée caouane;
 Figuier (1892: 163): *Chelonia caretta*;
 Bureau (1898a: 330; 1898b: 18): *Chelonia caouana*;
 Lennier (1904: 215): caouanne;
 Angel (1946: 179), Hvass (1965a: 90), Hvass & Arnould (n.d.: 91): *Caretta caretta*;
 Mertens (1952, 1960b, 1964, 1968a: 24), Hellmich (1956: 88; 1962: 84), Leutscher (1966: 73): *Caretta caretta caretta*.

Ca 62, v.1961, dead, Atlantic Ocean, 200 miles West by North of St. Guénolé-Penmarc'h (Finistère).

The specimen was dead when found, but still fresh; live goose-barnacles were attached to the shell. The stuffed specimen is in the Café du Port, St. Guénolé (1965).

Carapace, long (along curve) 545 mm.

Ca 63, ♂, i.1965, stranded near Phare d'Eckmühl, St. Guénolé-Penmarc'h (Finistère). Laboratoire de Biologie Animale du Collège Scientifique Universitaire, Brest.

Carapace, long 755 mm, wide 600 mm.

Two bunches of goose-barnacles were attached to the shell, and barnacles are present on the snout (Alb. Lucas, in litt., 8.iii.1965).

Ca 64, 1899, Concarneau (Finistère). Muséum National d'Histoire Naturelle, Paris, no. 99.104; received from Deyrolle-Guillon.

Five vertebrals and five pairs of costals. Twelve marginals on the right, and thirteen on the left; three inframarginals on either side. Two pairs of prefrontals with a small scale at the intersection of the sutures.

Carapace, long 165.2 mm, wide 138.7 mm.

Ca 65, 12.viii.1963, alive, near île de Groix (Morbihan); aquarium of the Musée de la Pêche, Concarneau.

Ch. Viaud (in litt., 20.v.1970).

This Loggerhead was taken by the fishing boat "Brin d'Amour", whilst fishing for sardine.

Ca 66, Morbihan.

Taslé (1868: 45): *Chelonia caouanna*.

The museum of the Société Polymathique du Morbihan, Vannes, possesses a damaged carapace of *Caretta caretta*, which may be that of the turtle mentioned by Taslé (H. Marsille, in litt., 19.iii.1965).

Ca 67, viii.1911, alive, some miles off-shore, between Noirmoutier and the île d'Yeu (Vendée), leg. Mr. Coquard.

Durand (1932: 78): *Chelonia caouana*.

The specimen is preserved (stuffed) in the collection of the late G. Durand at the Château de Beautour, near La Roche sur Yon, now the property of the Muséum National d'Histoire Naturelle, Paris.

This turtle has six vertebral scutes and five pairs of costals; twelve marginals and three inframarginals on either side. Left two and right three prefrontals, with a small polygonal scale at the intersection of the sutures. From the suture between this small scale and the left posterior prefrontal an incisure starts that nearly divides the left posterior prefrontal into two shields.

Durand (1932: 78) gave the total length of this specimen as being 37 cm, and the width as 24 cm. The last-named measurement probably is that across the spread fore flippers. The carapace has a length of 254 mm, and a width of 218 mm.

After having been captured, the turtle was kept in an aquarium for some months. Whether August, 1911, is the actual month of capture is uncertain.

In his paper, Durand (1932: 78) mentions the specimen to have been captured in the summer of 1911; on the board upon which the stuffed specimen is mounted, the date is given as August, 1911, but with a query added. It may be that August is the month in which the specimen died.

Ca 68, 29.vi.1893, 4 miles North of the île d'Yeu (Vendée). Muséum d'Histoire Naturelle, Nantes.

Borgogno (1894: 73, pl. II), Baudouin (1909: 500), Durand (1932: 78): *Chelonia caouana*.

Although no specific reference is made to this specimen, it probably forms the basis for the remark by Bureau (1898a: 330; 1898b: 18, *Chelonia caouana*) about this species occurring on the coast of the Vendée.

Carapace, long 180 mm.

On one side of the head the posterior prefrontal and supraocular have fused into one shield; on the other side the normal two shields are present.

Ca 69, 11.i.1930, found among the seaweed on the beach between Longeville and La Tranche, at about the level of the village of Conches (Vendée).

Durand (1932: 78): *Chelonia caouana*.

In the Durand collection at Château de Beautour (see Ca 67).

The date given above is that mentioned by Durand in his paper; the label mentions January 16th, 1930, and this may be the date upon which Durand received the specimen.

Durand (1932: 78) gave the total length as being 23 cm, and the width as 14 cm. The carapace has a length of 161.5 mm, and a width of 128.5 mm.

Five vertebrae, and five pairs of costals; thirteen marginals and three inframarginals on either side. Of the two pairs of prefrontals, those of the posterior pair are only narrowly in contact; they are almost separated by the anterior pair.

Ca 70, 15.ii.1930, dead?, found among the seaweed on the beach between Longeville and La Tranche, at about the level of the village of Conches (Vendée).

Durand (1932: 78): *Chelonia caouana*.

In the Durand collection at Château de Beautour (see Ca 67).

Durand (1932: 78) gives the total length as 25 cm, and the width as 15 cm. Exact measurements of the carapace could not be taken. The margin looks somewhat crumpled and the posterior marginal scutes are lost. The carapace (without the posterior marginals) measures about 183 mm.

Ca 71, Charente-Maritime.

Beltrémieux (1864: 4): Tortue caouanne.

Beltrémieux (1864: 37): *Testudo caretta*.

Beltrémieux (1884: 471): *Chelonia caouanna*.

Borgogno (1894: 74): *Chelonia caouana*.

In both papers, Beltrémieux states that the species is rare, in 1864 (p. 4) he mentions that a few specimens have been taken, but in the same paper (p. 37), and in 1884 (p. 471) he writes that several specimens had been captured. Although Beltrémieux (1864: 37) mentions the species to be represented in the Muséum Fleuriau, La Rochelle, there were no French specimens when I visited there in June, 1965.

Ca 72, date?, Pertuis Breton (Charente-Maritime); Musée de la Mer, St. Clément-des-Baleines, île de Ré.

Only the carapace has been preserved; the length is 880 mm, the width 710 mm. There are thirteen marginals on either side; five vertebrals and five pairs of costals.

Ca 73, date?, coast of the île de Ré (Charente-Maritime); Musée de la Mer, St. Clément-des-Baleines; presented by Mr. A. Neveu.

Carapace, long 163 mm, wide 142.7 mm.

Five vertebrals and five pairs of costals, the scutes keeled; 12 marginals on the right and 13 marginals on the left side. Three inframarginals on either side. Both fore flippers and hind flippers each with two claws. Colour of carapace, reddish-brown.

Ca 74, ♀, 18.v.1966, alive, in oyster beds near Le Château, île d'Oléron (Charente-Maritime). Musées d'Histoire Naturelle, La Rochelle, R. 486.

Dr. R. Duguy (in litt., 19.vii.1966).

Length of carapace 265 mm; length of plastron 210 mm.

Ca 75, coast of Gironde.

Lataste (1876: 224): *Chélonée caouane*.

Borgogno (1894: 74): *Chelonia caouana*.

Lataste mentions the occurrence of this species on the coast of Gironde, and he states that it is represented in the Bordeaux Museum. The Muséum d'Histoire Naturelle, Bordeaux, has two Loggerheads, labelled "Atlantique". It is possible that one or both of them came from the Atlantic coast of France, but there is no definite proof of this. The fact that other specimens are labelled "Atlantique-Méditerranée" makes me doubt whether the label

"Atlantique" means more than just a general indication of the area where the species occurs.

Ca 76, summer of 1963, alive, Lacanau-Océan (Gironde). RMNH 17026. Carapace, long 198.2 mm, wide 164.5 mm.

The turtle was found alive on the beach by tourists, who brought it to the Institut de Biologie Marine, Arcachon. Mr. C. Cazaux, of this institute, presented it to the Leiden Museum, when I visited Arcachon in June, 1965.

Ca 77, ii.1951, Cap Ferret (Gironde). Muséum d'Histoire Naturelle, Bordeaux.

Ca 78, 1955, alive, off Cap Ferret (Gironde). Institut de Biologie Marine, Arcachon.

C. Cazaux (in litt., 12.iii.1965).

The turtle is still alive in the aquarium (28.vi.1965); the carapace has attained a length of 500 mm.

Ca 79, 1955, alive, Arcachon (Gironde). Institut de Biologie Marine, Arcachon.

C. Cazaux (in litt., 12.iii.1965).

The turtle was kept in the aquarium until 1963.

Ca 80, 1961, alive, Bassin d'Arcachon (Gironde). Institut de Biologie Marine, Arcachon.

C. Cazaux (in litt., 12.iii.1965).

Carapace, long 300 mm.

Ca 81-Ca 83, end of xi.1965, alive, beaches between Lacanau (Gironde) and Biscarosse (Landes).

C. Cazaux (in litt., 25.iii and 20.iv.1966).

These three specimens were found at about the same time ("presque simultanément") on beaches not far from Arcachon. The exact localities have not been noted, but they must have been situated between Lacanau, north of Arcachon, and Biscarosse, south of Arcachon. They were brought to the aquarium of the Station Biologique d'Arcachon. The one specimen that survived (Ca 81) is kept at the Arcachon aquarium.

Length of carapace: Ca 81, 245 mm; Ca 82, 220 mm; Ca 83, 190 mm.

Ca 84, 1963, alive, off the Landes coast. Institut de Biologie Marine, Arcachon.

C. Cazaux (in litt., 12.iii.1965).

The specimen was still alive in the aquarium, when I visited it on June 28th, 1965.

Carapace, long 600 mm (in 1965).

Ca 85, 1962, alive, off Cap Breton (Landes). Institut de Biologie Marine, Arcachon.

C. Cazaux (in litt., 12.iii.1965).

Alive in the aquarium (28.vi.1965). Carapace, long 320 mm.

Ca 86, iii.1915, Hossegor (Landes), leg. Mrs. S. Cadilhon. Muséum d'Histoire Naturelle, Bayonne.

Carapace, long 270 mm, wide 236 mm.

Thirteen marginals on either side. Three inframarginals on either side; on the left side the postero-lateral part of the third inframarginal has become separated, and in this way it seems as if four inframarginals are present, but the additional scute does not reach the femoral scute. A single lozenge-shaped scale is wedged in between the two pairs of prefrontals.

Ca 87, date?, between Bidart and Guéthary (Basses Pyrénées). Muséum d'Histoire Naturelle, Bayonne.

Carapace, long 176 mm, wide 154.5 mm.

Thirteen marginals and three inframarginals on either side. The two pairs of prefrontals are in contact over their whole length.

Ca 88-Ca 135, alive, 1935-1965.

Ca 136-Ca 137, alive, i.1963.

These turtles were captured in an area from Cap Breton (Landes) along the coast of Basses Pyrénées to the Spanish coast of the Bay of Biscay.

Dr. L. Barrietty (in litt., 26.ii.1965) writes that since the Musée de la Mer, Biarritz, was opened thirty years ago, more than fifty Loggerheads were received. In some years several specimens were brought to the Museum. Even in the cold months of the year, and especially in January 1963, Loggerheads were received. It is to be regretted that neither the exact number nor the exact dates have been noted. For the present purpose I have accepted the number as having been fifty, and that two of these were taken in January 1963; possibly these numbers are too low.

In 1965 the largest specimen still alive in the aquarium at Biarritz measured

1100 mm (total length), and weighed about 100 kg. The Loggerheads brought to the museum were all juveniles, weighing about 1 kg.

Of these specimens I have seen seven: five in the aquarium at Biarritz, and two in the aquarium at St. Malo.

SPAIN

Relatively little information is available about the occurrence of *Caretta caretta* in Spanish Atlantic waters. Lopez Seoane (1877: 350, repr.: 2) states that the species is more common on the Cantabrian coast, than inside the rias; in a later paper, the same author (Lopez Seoane, 1884: 19) remarks that the species is rare along the coast of the Cantabrian Sea (i.e., the Bay of Biscay in the wider sense). As has been mentioned above (Ca 88-Ca 137), some of the Loggerheads brought to the Musée de la Mer, Biarritz, will have been taken off the Spanish coast, but no definite localities were recorded. It may be mentioned that Graells (1870: 299) stated that, during his stay in the area of El Ferrol, he did not see any turtles, not in the rias and not in the open sea, and neither did he obtain any information about their occurrence.

Ca 138, date?, off San Sebastian. Museo Naval y Aquarium de la Sociedad de Oceanografía de Guipúzcoa, San Sebastián.

Brongersma (1968h: 441, pl. I): *Caretta caretta*.

Length of carapace, 184.5 mm; width, 157 mm.

The specimen is remarkable for having only four costal scutes on the left side; on the right side the normal number of five costals is present; five vertebrals. Thirteen marginals on either side; on the left side the first marginal is excluded from contact with the first vertebral by the second marginal and the nuchal forming a suture. On both sides a small extra scute is present between the costals and the marginals; on the right side this small scute is bordered mesially by the third and fourth costals, and laterally by the eighth and ninth marginals. Its position is the same on the left side, but due to the reduction in the number of costal scutes, the small extra scute is bordered mesially by the second and third costal (which correspond with the third and fourth of the right side) and laterally by the eighth and ninth marginals. Three inframarginals on either side; no pores. Two pairs of prefrontals; the anterior pair extends posteriorly to reach the frontal and thus separates the posterior prefrontals from each other.

Ca 139, date?, alive, off San Sebastian. Museo Naval y Aquarium de la Sociedad de Oceanografía de Guipúzcoa, San Sebastián.

A young specimen was kept alive in the San Sebastian aquarium.

Ca 140, Ca 141, date?, off San Sebastian. Museo Naval y Aquarium de la Sociedad de Oceanografía de Guipúzcoa, San Sebastián, carapaces only.

Snr. D. Jesus Urrutia, secretary of the Sociedad de Oceanografía de Guipúzcoa, informed me that turtles are but fairly rarely taken by fishermen from San Sebastián, and then far from the coast, in the Bay of Biscay.

Ca 142, 19.iv.1787, alive, just outside the Ría del Ferrol (Prov. La Coruña).

Cornide (1788: 113): Tortuga Carey.

The turtle was taken by fishermen from Puente deume, and it was deposited in the cabinet of Don Andres Zavala, administrator-general of customs at La Coruña. Cornide (1788: 113-114) is somewhat confused about the identification of this turtle; on p. 114 he states that it is perfectly similar to the species, which Linnaeus named *imbricata*, and which in America was called Tortuga Carey, but also that it resembles the turtle figured by Rondelet (which is a Loggerhead). Under the heading Tortuga Carey (p. 113), Cornide quotes the diagnosis of *Testudo caretta*, such as this was given by Linnaeus (1766: 351).

However this may be, the description shows clearly that the specimen was a Loggerhead. It is stated that the shell was divided into sixteen scutes, arranged in three series (i.e., two series of five costals each, and a series consisting of the nuchal and five vertebrals), surrounded by twenty-two smaller shields (eleven pairs of marginals): the scutes of the median series showed spine-like keels. The carapace had the colour of ripe chestnuts ("color de castaña madura").

The measurements were given in "pulgadas", a Castillian pulgada being equivalent to 23.22 mm (von Kloeden, 1877: 1161). Length of carapace, 11 pulgadas (ca. 255 mm); the width across the widest part is said to have been as much (i.e., also 11 pulgadas), but if this statement is more or less correct, the width must have been measured along the curve. Length of fore flippers, 8 pulgadas (ca. 186 mm); of hind flipper, 5 pulgadas (ca. 116 mm). Each flipper with two claws.

The turtle was kept alive for five and a half months in a pail with sea water, and Cornide (1788: 118-119) sees in this an indication that turtles would do well in Spanish waters. Referring to the suggestion by Laborie about importing turtles to French Atlantic waters (see De 124), Cornide is of the opinion that turtles would find even better circumstances along the Spanish coast; he adds that not only delicious food may be obtained in this way, but one would also obtain more variation in the meals during Lent.

Ca 143, Ría del Ferrol (Prov. La Coruña).

Lopez Seoane (1865: 44): *Chelonia imbricata*.

Lopez Seoane (1877: 350, repr.: 2; 1884: 19), Boscá (1881a: 283): *Thalassochelys caretta*.

The first reference (Lopez Seoane, 1865: 44), which records *Chelonia imbricata* from the Ría del Ferrol, rather suggests that it was based upon Cornide's report (Ca 142). However, there is no proof of this, and it is equally well possible that Loggerheads have been observed in the Ría del Ferrol itself, and more than once.

Ca 144, vi.1947, alive, La Coruña. Museo de Zoología Regional, Santiago de Compostela.

Marginals: 13 on either side; inframarginals: 3 on either side. Prefrontals asymmetrical, the left posterior prefrontal divided into two shields, the one behind the other. Two inframandibular scales on either side. Each flipper with two claws.

Ca 145, vii.1948, alive, La Coruña. Museo de Zoología Regional, Santiago de Compostela.

Carapace, long 533 mm; wide 470 mm.

Marginals: 13 on either side; inframarginals: 3 on either side; the first and second vertebral show a slightly distinct keel. Each flipper with two claws.

Ca 146, 12.iv.1937, alive, Lage (Prov. La Coruña).

Prof. I. Parga-Pondal (in litt., 4.v.1966).

The carapace was covered by fifteen large scutes, arranged in three series, a nuchal, and thirteen marginals on either side. The vertebrals and costals were keeled. Each flipper with two claws.

The carapace was bright chestnut in colour; the flippers were yellowish. These data definitely show that the specimen was a Loggerhead.

Ca 147, 1937, alive, Lage (Prov. La Coruña).

Prof. I. Parga-Pondal (in litt., 4.v.1966).

This turtle was similar to the preceding one (Ca 146), but larger. The length of the carapace was about 350 mm.

Prof. Parga-Pondal adds that such turtles are observed from time to time on the coast at Lage.

Ca 148, Ría de Arosa (Prov. La Coruña and Prov. Pontevedra).

Lopez Seoane (1877: 350, repr.: 2; 1884: 19), Boscá (1881a: 283): *Thalassochelys caretta*.

Ca 149, Ría de Pontevedra.

Lopez Seoane (1877: 350, repr.: 2; 1884: 19), Boscá (1881a: 283): *Thalassochelys caretta*.

Boscá (1881a: 283) states that a specimen from the Ría de Pontevedra, had been preserved in the Real Instituto, Ciudad-Real.

Ca 150, Ría de Vigo (Prov. Pontevedra).

Lopez Seoane (1877: 350, repr.: 2; 1884: 19), Boscá (1881a: 283): *Thalassochelys caretta*.

Ca 151, vi.1947, alive, Ría de Vigo (Prov. Pontevedra). Museo de Zoología Regional, Santiago de Compostela.

A more or less lozenge-shaped shield is intercalated between the two pairs of prefrontals; three inframandibular scales on either side. Marginals: 13 on the right and 12 on the left side; inframarginals: 3 on either side. Each flipper with two claws. Colour of carapace: reddish-brown.

Carapace, long 232 mm; wide 192 mm.

Ca 152, vi.1947, alive, Ría de Vigo (Prov. Pontevedra). Museo de Zoología Regional, Santiago de Compostela.

Two scales are wedged in between the two pairs of prefrontals; there are three to four inframandibular scales. Marginals: 12 on the right, and 13 on the left side; inframarginals: 3 on either side. Each flipper with two claws. Colour of carapace: reddish-brown.

Carapace, long 282 mm, wide 235 mm.

Ca 153, ix.1953, alive, Ría de Vigo (Prov. Pontevedra), received from D. Emilio Sanchez. Museo de Zoología Regional, Santiago de Compostela.

Two pairs of prefrontals, those of the posterior pair separated by an extra shield. The vertebrals show a keel at their posterior margin. Marginals: 13 on either side; inframarginals: 3 on either side. Each flipper with 2 claws.

The carapace was not measured by me. Prof. I. Parga-Pondal (in litt., 4.v.1966) gives the length of this turtle to be 57 cm, and this will have been the total length.

Ca 154, West coast of Spain. SMF 58038.

The turtle was presented to the Senckenberg Museum on May 26th, 1961.

Carapace, long 195 mm, wide 163 mm (Prof. Dr. R. Mertens, in litt., 8.viii.1967). With the indication "West coast of Spain", the coast of Galicia will be meant.

Ca 155, Atlantic coast of Spain. SMF 61417, shell.

The Senckenberg Museum received the shell from the Zoologische Institut, Frankfurt am Main.

Carapace, long 310 mm, wide 257 mm (Prof. Dr. R. Mertens, in litt., 8.viii.1967).

Ca 156, x.1958, alive, off Cadiz. Instituto de Investigaciones Pesqueras, Laboratorio de Cadiz.

Dr. Julio Rodríguez-Roda (in litt., 23.i.1968).

Carapace, long 355 mm, wide 315 mm.

Ca 157, ca. 13.i.1968, alive, off Cadiz. Jardín Zoológico y Botánico "Alberto Durán", Jerez de la Frontera.

Mr. Francisco Carabantes (in litt., 24.i.1968).

The turtle was purchased at the fish market of Puerto de Santa Maria. Carapace, long (along curve?) 740 mm; weight 80 kg.

Ca 158, i.1968, alive, Straits of Gibraltar. Jardín Zoológico y Botánico "Alberto Durán", Jerez de la Frontera.

Mr. Francisco Carabantes (in litt., 24.i.1968).

Carapace, long (along curve?) 630 mm, weight 50 kg.

Ca 159, i.1968, alive, Straits of Gibraltar. Jardín Zoológico y Botánico "Alberto Durán", Jerez de la Frontera.

Mr. Francisco Carabantes (in litt., 24.i.1968).

Carapace, long (along curve?) 570 mm; weight 25 kg.

PORTUGAL

The occurrence of *Caretta caretta* in Portuguese waters is mentioned, inter alia, by:

Bocage (1863: 332): *Chelonia caouana*;

Boscá (1877: 45; 1881a: 283), Nobre (1895: 59): *Thalassochelys caretta*;

Boscá (1881b: 111): *Thalassochelis caretta*;

Osorio de Castro (1954: 231), Brongersma (1966: 52; 1967a: 3): *Caretta caretta*.

Ferreira (1893: 26, *Thalassochelys caretta*) mentions the species being rare in the North. As is to be expected of a species, which is considered to be common, relatively few specified records have been published.

Nobre (1895: 59, *Thalassochelys caretta*) mentions a specimen from Portugal from the old collection in the zoological cabinet of the Academia

Polytechnica of Porto. This might be the specimen recorded here as Ca 163 or Ca 164.

Ca 160, ad., Portuguese waters. Museu Bocage, Lisbon.

Ferreira (1893: 26), Nobre (1935: 4): *Thalassochelys caretta*.

The turtle was presented by D. Luiz I (born 31.x.1838 — died 19.x.1889; ruled: 23.xii.1861-19.x.1889).

Ca 161, ad., large, Portugal. Museu Bocage, Lisbon.

Ferreira (1893: 26), Nobre (1935: 4): *Thalassochelys caretta*.

The specimen was presented by D. Fernando II (born 29.x.1816 — died 15.xii.1889; regent 1853-1855).

Ca 162, off the Portuguese Coast.

This specimen was seen by me in the Café Gouzier, St. Guénolé-Penmarc'h, Finistère, France.

Ca 163, Northern Portugal. Museu do Pôrto.

Nobre (1935: 2): *Thalassochelys caretta*.

Ca 164, near the coast, off Pôrto.

Nobre (1935: 5): *Thalassochelys caretta*.

Ca 165, 1889, Buarcos. Museu Zoológico, Coimbra.

Oliveira (1896: 28), Vieira (1896: 152), Ferreira & De Seabra (1911: 104), Nobre (1935: 4): *Thalassochelys caretta*.

Themido (1942: 21): *Caretta caretta caretta*.

Bedriaga (1889: 87) states that there are two specimens from Buarcos in the Coimbra Museum.

Ca 166, Estramadura.

Sequeira (1886: 274): *Thalassochelys caretta*.

Oliveira (1896: 28): *Thalassochelys caretta*.

Ca 167, Ca 168, 1965, alive, off Cabo da Roca.

Dr. Herculano Vilela (in litt., 2.iv.1966) writes me that some live specimens were caught by trawlers on the Portuguese West Coast off Cabo da Roca in 1965. The specimens (number not mentioned) are kept in the Aquário Vasco da Gama, Lisbon.

Ca 169, Praia de Oeiras, costa de Cascais.

Bragança (1903, not seen).

Nobre (1935: 4): *Thalassochelys caretta*.

Ca 170, Tejo (river Tagus).

Ferreira & De Seabra (1911: 104, fairly common), Nobre (1935: 4, very common): *Thalassochelys caretta*.

Ca 171, Sezimbra.

Nobre (1894: 59, not seen).

Nobre (1935: 4): *Thalassochelys caretta*.

Ca 172, ♀, vi.1957, Sezimbra. Museu Bocage, Lisbon.

Pissarro (1958: 165): *Caretta caretta*.

Total length 640 mm; width 410 mm; weight 16 kg.

Length of carapace (in straight line) 500 mm (Prof. Dr. C. F. Saccarão, in litt., 17.v.1967).

Ca 173, Algarve.

Oliveira (1896: 28), Ferreira & De Seabra (1911: 104), Nobre (1935: 4): *Thalassochelys caretta*.

Ca 174, 15.i.1873, alive, 12 miles off Cape St. Vincent.

Murray (1895: 117): *Chelone imbricata*.

The turtle was captured by H. Brit. M. S. "Challenger".

Ca 175, 1889, juv., Faro. Museu Zoológico, Coimbra.

Bedriaga (1889: 87), Vieira (1896: 112), Ferreira & De Seabra (1911: 104), Nobre (1935: 4): *Thalassochelys caretta*.

Themido (1942: 21): *Caretta caretta caretta*.

Nobre (1935: 4) mentions 1890 as the year in which this turtle was taken, but it was already mentioned by Bedriaga in 1889.

Ca 176-Ca 187, alive, Portuguese waters. Aquário Vasco da Gama, Lisbon.

Carr (1957: 48): *Caretta caretta caretta*.

II B. List of records of unidentified turtles, which may have been *Caretta caretta* (L.).

GREAT BRITAIN

SCOTLAND

Uca 1, 22.viii.1861, alive, near Rowardennan Lodge, Loch Lomond (Stirling).

Smee (1861: 351-352): a live Turtle of some kind.

Sutherland (1861), Van Lidth de Jeude (1895a: 211): *Chelonia caretta*.

Gadow (1901: 387), Ritchie (1924a: 102): *Thalassochelys caretta*.

Babcock (1919: 346): *Caretta caretta*.

Stephen (1953: 109, 110, no. 5), Taylor (1963: chart 8): unidentified.

This turtle is mentioned in two letters written by Mr. A. D. Smee to Dr. J. E. Gray, and which were published in the *Annals and Magazine of Natural History* (Smee, 1861). Although Smee definitely states that he did not know to which species the turtle belonged, his letters appeared under the heading "On the occurrence of the Loggerhead Turtle in Scotland". This title probably has been added by Gray (one of the editors of the journal), and who may have been influenced by the note preceding Smee's letters; this note deals with the Loggerhead captured at Pennan. However this may be, there is nothing in Smee's letters that makes an identification possible. Correctly, Stephen (1953) and Taylor (1963) placed this specimen with the unidentified turtles. It was supposed at the time, that the turtle came up the River Leven, which was unusually swollen, and that it so entered Loch Lomond.

The length is given as being 11½ inches (292 mm), breadth 10 inches (254 mm).

ENGLAND

Uca 2, 5.x.1874, alive, about 2 miles S of Mousehole I., Mount's Bay (Cornwall).

Cornish (1874a: 4242; 1874b: 4258): Green Turtle.

Cornish (in Couch, 1878: 30): *Chelonia viridis*.

J. Clark (1906: 307): *Chelone mydas*.

Cornish (1874a) published the following note on this turtle:

"A turtle, alive, was yesterday morning taken in a pilchard driftnet, about two miles south of Mousehole Island, in Mount's Bay, a spot well within the headlands of the bay; this would be in about twenty-nine fathoms water, rocky bottom, and the net would be fishing at from two to four fathoms from the surface. Its weight is about seventy to eighty pounds, and it corresponds in all respects with Wood's description of the "green turtle", except that its upper mandible projects slightly over the lower, and neither upper nor lower is (that I, examining it in a show-booth, could see) notched or serrated. The plates of the carapace corresponded precisely with those of the green turtle, and did not overlap, as is mentioned in the hawk's bill. When captured it was covered with barnacles and sea-weed, but showed no signs of weakness. The fore left flapper is partly carried away, but the wound is an old one, or at least is thoroughly healed. I take it for granted that the reptile must have been lost from some ship homeward bound from the West Indies or thereaway; but I note the fact that no ship known to have turtles on board has been lost in Mount's Bay since one in the winter of 1871-2, from which to my knowledge, two living turtles were saved."

Some days after the turtle was captured, fishermen from Penzance about six miles from the coast found a partly open packing case floating in the sea. It was covered with barnacles, and inside it they found a live fish. Cornish (1874b) considered this fish to be of tropical origin; he described it as a new species: *Pimelepterus cornubiensis*. The occurrence of the turtle and this fish in the same area, and at about the same time, led Cornish to the

conclusion that both may have crossed the Atlantic Ocean with the current (Cornish, 1874a: 4258, and in: Couch, 1878: 30).

For the sake of completeness I may point out that *Pimelepterus cornubiensis* Cornish is nowadays considered a synonym of *Palinurichthys perciformis* (Mitchill), a species which according to Jordan & Evermann (1896: 694) is found on the Atlantic coast of North America from Cape Hatteras to Maine, and which is rather common northwards especially about Cape Cod. Merriman (1945: 840) gives the range of this species as being: New Point, Virginia, to Nova Scotia. In Merriman's opinion, this species is bathypelagic, and only immature specimens come sometimes to the surface in the coastal waters of North America. It has a habit of following ships, or associating itself with floating objects. Merriman (1945: 842-843) writes further: "it seems reasonable to infer that this is normally a pelagic or open-sea form. Such a habitat would permit a far more reasonable explanation of the specimen described by Cornish..., for instead of having drifted across the Atlantic from the coast of North America to England in a packing case, the fish could have become associated with this floating object at a relatively short distance from the point on the Cornwall coast where it was taken."

However this may be, whether or not there is any connection between the occurrence of the turtle and that of the fish, the fact that the turtle was covered with barnacles and sea-weed makes it unlikely that it was brought to Cornwall on board a ship.

Whether Cornish's turtle was really a Green Turtle seems doubtful to me, and I am not yet convinced that it was not a Loggerhead. It is true that Cornish (1847a) mentioned the plates of the carapace to correspond precisely with those of the Green Turtle, but his remarks about the upper and lower "mandible" point more to the Loggerhead. It is not impossible, that Cornish using the description and figures published by Wood (i.e., Wood, 1863: 21-22) was more concerned with the differences between the Green Turtle and the Hawksbill, than with the differences between these species and the Loggerhead (which was not figured by Wood). It may well be, that Cornish, examining the turtle in a show-booth, overlooked the anterior pair of small costal shields that are present in the Loggerhead.

An attempt to obtain some more information about a ship carrying turtles, wrecked in Mount's Bay in the winter of 1871/1872 remained without results. Mr. R. C. E. Lander, shipping editor of Lloyd's, London, informs me (in litt., 19.v.1967) that no report of such a vessel can be found in "Lloyd's List" for the period October, 1871, to March, 1872.

EIRE

Uca 3, late xii.1945, Sherkin Island (Co. Cork).

Freeman (1946: *Caretta caretta*) mentions two turtles from Sherkin Island; one of these he examined, and this he identified as being a Logger-

head (Ca 50). He did not see the other turtle, and although he assumed it to have been also a Loggerhead, there is no certainty about this.

Uca 4, 10.iii.1926, Clonakilty Bay (Co. Cork).

Rohu (1926): Loggerhead Turtle.

Length about 11 inches (ca. 279.5 mm).

Rohu does not mention any features, which might allow of a definite identification to be made. Therefore, I have placed this turtle with those, of which the identification is uncertain.

THE NETHERLANDS

Uca 5, 2.x.1707, alive, Wijkmeer.

Burger (1710: 233; 1728: 530; 1736: 231; 1767: 171), Bruins (1732: 430, note 1), Van Iperen (1778: 623), Van der Aa (1849: 426), Meijer (1889: 44): schildpad.

Houttuyn (1764: 16), Statius Müller (1774: 21): *Testudo mydas*.

Chomel (1778: 3286): Zeeschildpad.

Schneider (1783: 46): not identified.

Wilhelm (1818: 151): *Testudo viridis*.

Van Bemmelen (1866: 530), Huizinga (no date, *a*: 164, note 1; *b*: 121, note 1): probably *Sphargis coriacea*.

Van Lidth de Jeude (1895*a*: 211): "a Chelonia".

Van Kampen & Heimans (1927: 51): no identification (but refer to Van Bemmelen (1866)).

Brongersma (1961: 37-39, pl. I): probably *Caretta caretta*.

This specimen had a length of nearly six feet Amsterdam measure (1700 mm), and a weight of between 400 and 500 Amsterdam pounds (197-247 kg). I have discussed this turtle at some length in a previous paper (Brongersma, 1961: 37-39, pl. I), and arrived at the conclusion that it may have been *Caretta caretta*. The fact that the contemporary drawing shows shields on the carapace (however inaccurate the drawing is) makes it unlikely that it was a Leathery Turtle as suggested by Van Bemmelen (1866: 530). The drawing shows some barnacles on the carapace, and this also points to the specimen being a turtle with horny shields, rather than a Leathery Turtle.

II *C. caretta caretta* (L.). Discussion

The data from the list of records have been arranged chronologically (year by year) in table 2, and these data have been recapitulated in tables 3*a* and 3*b*.

For the northern area the data from the years 1901 to 1970 have been presented graphically in the histogram of fig. 33. Before 1938 records of *Caretta caretta* were scarce. In 1938 and 1945 small 'invasions' of Loggerheads (in 1938 together with *Lepidochelys kempii*) took place in British

and Irish waters. These invasions and the pamphlet on stranded (whales and) turtles published by the British Museum (Natural History) (Fraser & H. W. Parker, 1949; 2nd ed., 1953) greatly stimulated the interest in turtles, and reports upon Loggerheads (and other turtles) stranded or captured in British and Irish waters came in more or less regularly. However, as is shown by fig. 33, Loggerheads were not recorded every year. Periods and years with one or more records of Loggerheads alternate with periods and years (1939-1943, 1947-1949, 1956, 1965-1969) in which no Loggerheads were recorded. That there are but few records for the period 1939 to 1945 is not astonishing, this period was that of the second world war, and people had other matters than turtles to think about. It is more difficult to explain why no Loggerheads were recorded in the years 1965 to 1969. One may ask whether this lack of Loggerhead records was due perhaps to a lack of interest in the occurrence of small turtles, but it is not very likely that this was the only reason, because in a number of years in which no Loggerheads were reported people did report the presence of other small turtles, e.g., in the years 1939, 1941, 1943, 1947, 1949, 1967, 1968 and 1969 specimens of *Lepidochelys kempii* were recorded (fig. 34); moreover in 1940 (Un 37), in 1948 (Ue 12), and in 1967 (Un 29) unidentified turtles were reported upon (fig. 35). One or more of these unidentified turtles and some others as well may have been Loggerheads, and thus the gaps in the series of records for the Loggerhead may be smaller than at present supposed. Still, there remain a number of years from which no Loggerheads (nor other small turtles) are known, and the number of records for the last decennium (1961-1970) is definitely lower than in the preceding two decennia. Therefore, it indeed may be that Loggerheads are becoming more scarce in the northern area of European Atlantic waters. If our views are correct that most, if not all, of our turtles do come from the American side of the Atlantic Ocean, the reason for the decline in the number of records may have to be looked for in U.S.A. It is well known that the nesting beaches of the Loggerhead along the Atlantic coast of U.S.A. are endangered by the development of beaches for residential or commercial use, by an increased use of the beaches by the public, which disposes to-day of means of transportations that will bring it easily to lonely beaches (Le Buff, 1970: 14-15). The number of suitable beaches decreases and with them the number of Loggerhead nests. Electric lighting along coastal highways (McFarlane, 1963: 152), lights in buildings and on the beach lead to the disorientation of the hatchlings and this may lead to the destruction of large numbers of hatchling turtles. If less and less hatchling Loggerheads enter the sea, the chances that Loggerheads will cross the ocean to European waters become smaller and smaller. It is

this reduction in the number of Loggerheads that may cause the decrease in the number of European Atlantic records.

Little can be said about the distribution of the records from the central area over the years in the period 1931-1970. Dr. L. Barrietty (in litt., 26.ii.1965) informed me that in the course of thirty-five years (1930-1964) more than fifty Loggerheads were received by the Musée de la Mer, Biarritz, but the individual dates of capture had not been recorded. When I visited the Musée de la Mer once again in 1968, to see whether any records had been added, I learned that since my visit in 1965 no further Loggerheads had been received. Although the exact year of capture is unknown for more than two-thirds of the number of Loggerheads from the central area, the remaining data have been presented in fig. 33. In some of the years that Loggerheads were not recorded from the northern area, specimens were taken in the central area.

The number of records from the southern area of which a definite year is known is too small to allow of any conclusions. Whether the decrease in the last decennium (1961-1970) is real, or that it is just due to a lack of interest in reporting turtles is not known.

In table 7 the individual records from the northern and central areas are listed according to the months in which the turtles were observed. For each area the records have been divided into three groups, one containing the turtles that have been observed alive, one containing the dead specimens, and one containing the turtles of which the record does not indicate whether the specimen was alive or dead. These data have been recapitulated in table 8, and they have been presented graphically in fig. 38.

Although S. F. Hildebrand & Hatsel (1937: 375) state that the Loggerhead is very sensitive to cold, it is a hardier species than the Leathery Turtle. The Loggerhead breeds farther to the north than any other species of turtle in the Atlantic Ocean. On the east coast of North America it nests up to 35°N (Coles, 1914: 3) and in the past nests were found even farther to the north, in Virginia (Carr, 1952: 390). On the Atlantic coast of Morocco it also nests to about 35°N (Pasteur & Bons, 1960: 27), and in the Mediterranean, on the Italian west coast, even to about 43°N (Bruno, 1969: 13).

In the northern area, live Loggerheads have been found in ten out of the twelve months of the year (fig. 36). The exceptions are the months of June and March. In June no Loggerhead at all has been reported, neither alive, nor dead. From March we have one record (Ca 46) of which it is not known whether the specimen was alive or dead. In no single month (with perhaps March as an exception) does the number of dead specimens surpass that of the live ones. That the Loggerhead can stand lower tempera-

tures of the surface water much better than the Leathery Turtle is also evident from the fact that the number of records of live Loggerheads reaches a definite peak in December; the majority of the eleven December records stem from the first two decades of that month (1-10.xii: 4 records; 11-20.xii: 5 records). Live specimens have been recorded in other cold months as well. Although the temperature of a Loggerhead may be from 0.6 to 3°C higher than that of the surrounding water (Albert Ier, 1903: 215; 1932b: 32; Richard, 1910: 89), it is clear that low temperatures of the sea will not be exactly favourable for Loggerheads, and that the cold will make the turtles less active. When in winter Loggerheads come close to the coast, gales and storms will drive them ashore, and these turtles will have little chance to return to the open sea. Whilst most records of the Leathery Turtle are based upon specimens sighted or captured at sea, most records of the Loggerhead are based upon specimens that were stranded alive or dead. Only very rarely has the Loggerhead been captured at sea in the northern area; Ca 23 and Ca 27 were taken at sea; this was also the case with Uca 2, a specimen which originally was reported as having been a Green Turtle, but which I believe to have been a Loggerhead. Ca 11 and Ca 12 were taken in nets placed in shallow coastal waters. As will be shown below, the majority of the Loggerheads taken in the northern and central areas are small or half-grown specimens, and such small specimens will not be easily noticed at sea. Thus, even when they are present in the northern area at the same time as Leathery Turtles, small Loggerheads will escape notice and they will not be recorded, unless they are captured or are stranded.

The number of records from the central area of which the month is known is so small (fig. 36) that it does not warrant a discussion. It may be mentioned though that even in very cold winters Loggerheads were received by the Musée de la Mer (i.e., in January 1963; Dr. L. Barrietty, in litt., 26.ii.1965). In the central area data on stranded specimens are scarce. Out of 85 specimens recorded from this area only nine (Ca 63, Ca 69, Ca 70, Ca 76, Ca 81, Ca 82, Ca 83, Ca 86, Ca 87) were found ashore; the other 76 specimens were taken at sea.

The data on the Loggerheads from the southern area are too scanty to allow of a discussion. From table 3b it would appear that the number of Loggerheads has decreased strongly in the last decennium (1961-1970), but I am convinced that a survey of the captures in the southern half of Portugal and along the Spanish coast will prove Loggerheads still to be common.

Size. In literature various measurements are used to indicate the size of the specimens, e.g., the total length, the length of the carapace, the width of

the carapace, or the weight. As live Loggerheads when handled tend to withdraw part of their neck into the shell, and as dying Loggerheads almost invariably do so, the total length is an unsatisfactory measurement. The most useful measurement is the length of the carapace, but the difficulty is that this measurement is taken in different ways by different authors. Some measure the length of the carapace with a flexible tape along the curve in the median line. It depends on the flexibility of the tape how exact the measurement will be. In adult specimens the tape can be pressed against the surface of the carapace over its whole length, but in juveniles, in which the keels of the vertebral scutes end in knob-like spines, one cannot press the tape against the surface of the carapace over the whole length; probably the curved length in juveniles often is taken just laterally of the keels, and then it is not equal to the median length. The best way to indicate the size is to take the median length of the carapace between perpendiculars (straight-line measurement) from the anterior border of the nuchal to a line connecting the posterior tips of the last marginal scutes (supracaudals). To give some idea of the difference between the measurements of the carapace along the curve and in straight line (length and width), these have been indicated for a number of specimens in table 9; the curved measurements of the juveniles have been taken over the keels of the vertebral scutes. Although no definite method can be given to convert measurements taken along the curve into straight-line measurements, the table may help to make a rough estimate of the one measurement if the other is given.

Out of 188 recorded Loggerheads, the length of the carapace has been measured in 70 specimens (Northern area: 43, Central area: 18, Southern area: 9); of 76 specimens (Northern area: 9; Central area: 54; Southern area: 13) there is some information that gives an indication of the size; of 42 specimens (Northern area: 11; Central area: 13; Southern area: 18) there is no indication at all about the size.

In table 10 the specimens of which the length of the carapace is known have been arranged in size classes, each of 25 mm range. The turtles of which only the curved carapace length has been given in literature have been marked by adding *c* to their serial number; to make such specimens comparable with the others, they should be moved one or two classes towards the lesser lengths. In the histograms of fig. 39 the specimens from the northern and central areas have been grouped in size classes of 50 mm range, but for the smaller specimens (length of carapace 151-300 mm) histograms with 25 mm size classes have been added (fig. 42).

From table 10 and fig. 39 it is clear that only very few adult Loggerheads come to European Atlantic waters. To discern between adult individuals on

the one hand and half-grown and juvenile specimens on the other hand, the measurements of females taken on nesting beaches may be used for comparison. Caldwell, Carr & Ogren (1959: 305) give the straight-line length of the carapace of 110 females from Jekyll Island (Georgia, U.S.A.) as ranging from $31\frac{1}{4}$ to $45\frac{1}{4}$ inches, i.e., from 794 to 1149 mm; 18 females nesting at Cape Romain (South Carolina, U.S.A.) measured by Baldwin & Lofton (Caldwell, 1959a: 321) ranged from $33\frac{1}{4}$ to $40\frac{1}{2}$ inches (845 to 1029 mm). In 134 females from Tongaland (East coast of South Africa) the length of the carapace (measured along the curve) varied from about 79 cm to 105 cm (Hughes, Bass & Mentis, 1967: fig. 6), with a mean of 93.6 cm (l.c.: 19); the curved carapace length of 30 females from Tongaland measured by Hughes (1971: table 2) ranged from 87.0 cm to 102.5 cm, and the straight-line length of 29 females ranged from 80.7 cm to 95.0 cm (Hughes, 1971: table 2). The smallest nesting female thus would be the one with a curved carapace length of about 79 cm and of which the straight-line length may have been in the order of 750 mm. Although this female belonged to a different population, a straight-line length of 750 mm has been accepted by me, at least for the present, as the minimum length for fully adult (mature) females. On this basis, the females Ca 2, Ca 8, and Ca 59 from the northern area must be classified as adults. Nothing is known about the minimum carapace length of adult males, but for the present the same limit (minimum of 750 mm) is accepted. Thus, the male Ca 13 and the specimens Ca 19 and Ca 20 (sex not known), all three from the northern area, together with the male Ca 63 and specimen Ca 72 (sex not known), both from the central area must have been adults. Ca 157 from the southern area will not yet have been fully adult. The Loggerhead from Tenby (Ca 17) offers some difficulties; with a total length of 1467 mm ($57\frac{3}{4}$ inches) and a width of 800 mm ($31\frac{1}{2}$ inches) this turtle must be considered fully adult, but the weight said to have been 60 lb (27.2 kg) or $61\frac{1}{4}$ lb (27.8 kg) is that of a much smaller specimen. Ca 27 on account of its weight of 120 lb (54.4 kg) was not yet fully adult (see also the remarks upon weight). In this way only about nine fully adult Loggerheads have been recorded from European Atlantic waters.

The majority of the specimens are juveniles (151-300 mm carapace length) or halfgrown to nearly adult individuals. From the northern area eleven specimens have the carapace between 151 and 200 mm long, and from the central area eight specimens come into this class; thirteen specimens from the northern area have the carapace between 201 and 250 mm long, and two specimens from the central area come into this class. The central area also

has five specimens with a carapace length of between 251 and 300 mm; in the southern area three specimens have the carapace between 151 and 300 mm long. Thus out of 43 specimens from the northern area 24 specimens have the carapace not longer than 300 mm, and this is also the case with fifteen out of eighteen specimens in the central area, and with three out of nine specimens of the southern area. To these specimens may be added 69 individuals (Northern area: 5; Central area: 52; Southern area: 12) of which the exact length of the carapace is not known, but of which there are indications that they were juveniles. It is clear that Ca 1 is a juvenile; this does not only follow from the size of the specimen as compared to the size of the hand of the sailor that holds it, but it is also evident from the well marked keels on the vertebral scutes. A photograph of Ca 26 shows the turtle having distinctly keeled vertebral scutes and, hence, it is a juvenile turtle. Of Ca 29 the collector stated the shell to have been about eight inches (about 203 mm) wide, and this is the size of a juvenile. Ca 39 was said to have a weight of about 2 lb (i.e., about 0.9 kg), and this is the weight of a specimen about a year old. The collector of Ca 58 stated it to have been as large as a fair-sized crab, and a good-sized crab from the North Sea would measure about 250 mm. Of Ca 70 the posterior marginal scutes are lost; without these scutes the carapace is 183 mm long, and even with the marginals present, the carapace may not have measured more than 200 mm. After three years in captivity Ca 85 had the carapace 320 mm long, and at the time it was captured it must have been considerably smaller. Of Ca 88-137 it was stated that they weighed about 1 kg (Dr. L. Barrietty, in litt., 26.ii.1965), and this places them definitely with the juveniles of about a year old.

Carr (1957: 48) mentioned twelve Loggerheads from Portugal which all were young specimens, but as nothing further was said about them I take this only to mean that they were not adult and probably not even half-grown. There is a small number of Loggerheads which may be classified as young to about half-grown (the carapace between 301 and 650 mm long), viz., thirteen specimens from the northern area, one from the central area, and five from the southern area. To these can be added Ca 51, of which the length (total length?) was said to have been between 24 and 26 inches (620-660 mm), and Ca 84, which after two years in captivity had reached a carapace length of 600 mm. After ten years in captivity, Ca 78 had reached a carapace length of 500 mm; how small it was when captured one cannot say, for its growth apparently was extremely slow; a carapace length of 500 mm is reached by other captive specimens at an age of about three years (cf. table 13).

The relevant point from these data is that adult Loggerheads are extremely scarce in European Atlantic waters, and that especially very small specimens are fairly common.

Weight. Only a few European Atlantic Loggerheads have been weighed. To obtain an impression of the relation between the length of the carapace and the weight, these data have been given in table 11. For comparison the lengths and weights of five adult females from Cape Romain, South Carolina, U.S.A. (Baldwin & Lofton, in: Caldwell, 1959a: 321) have been added. Hughes, Bass & Mentis (1967: 19, fig. 8) published information about the carapace length and the weight of nesting females from Tongaland. These authors point out that the weight taken before the eggs are laid will be higher than that after laying; of one clutch of eggs the weight proved to be 13 lb (5.9 kg). Furthermore, these authors indicate that one individual weighed on separate occasions may show distinct differences in weight. From the graph presented by Hughes, Bass & Mentis (1967: fig. 8) it is also evident that individuals of about the same carapace length may have very different weights. The data mentioned here have been calculated from the graph and, thus, they are only approximate values. Females with the length of the carapace in the order of 93 cm may range in weight from about 200 lb to just over 260 lb (about 90.7 kg to just over 118 kg), and females with the carapace about 94 cm long may range in weight from 195 to 240 lb (about 88.5 kg to 108.9 kg). Even when one takes into account the rather wide range of individual variation, two European Atlantic Loggerheads do not fit in the picture, viz. Ca 17 and Ca 59.

The total length of Ca 17 was said to have been $57\frac{3}{4}$ inches (1467 mm) and the width was stated to have been $31\frac{1}{2}$ inches (800 mm). These measurements place this turtle among the large Loggerheads. If the width given for Ca 17 is the straight-line width, the specimen would be comparable to Ca 8 the carapace of which has a straight-line width of also 800 mm, and a curved carapace length of 1040 mm; if the width of Ca 17 is the width measured along the curve it would be larger than Ca 59 (curved carapace length 1000 mm). In this way Ca 17 would come into the class of Loggerheads of which the weight is between 250 and 310 lb (between 113 kg and 141 kg). However, the weight of Ca 17 was said to have been 60 lb ("West Wales Weekly Observer"), and a note in the Stranded Turtles File gives the weight as having been $61\frac{1}{4}$ lb (i.e., 27.8 kg). This weight is so far below that of specimens of comparable size, that one wonders whether an error was made when the turtle was measured, or when it was weighed. It is true that the right fore flipper was missing, and the weight will have been less than that

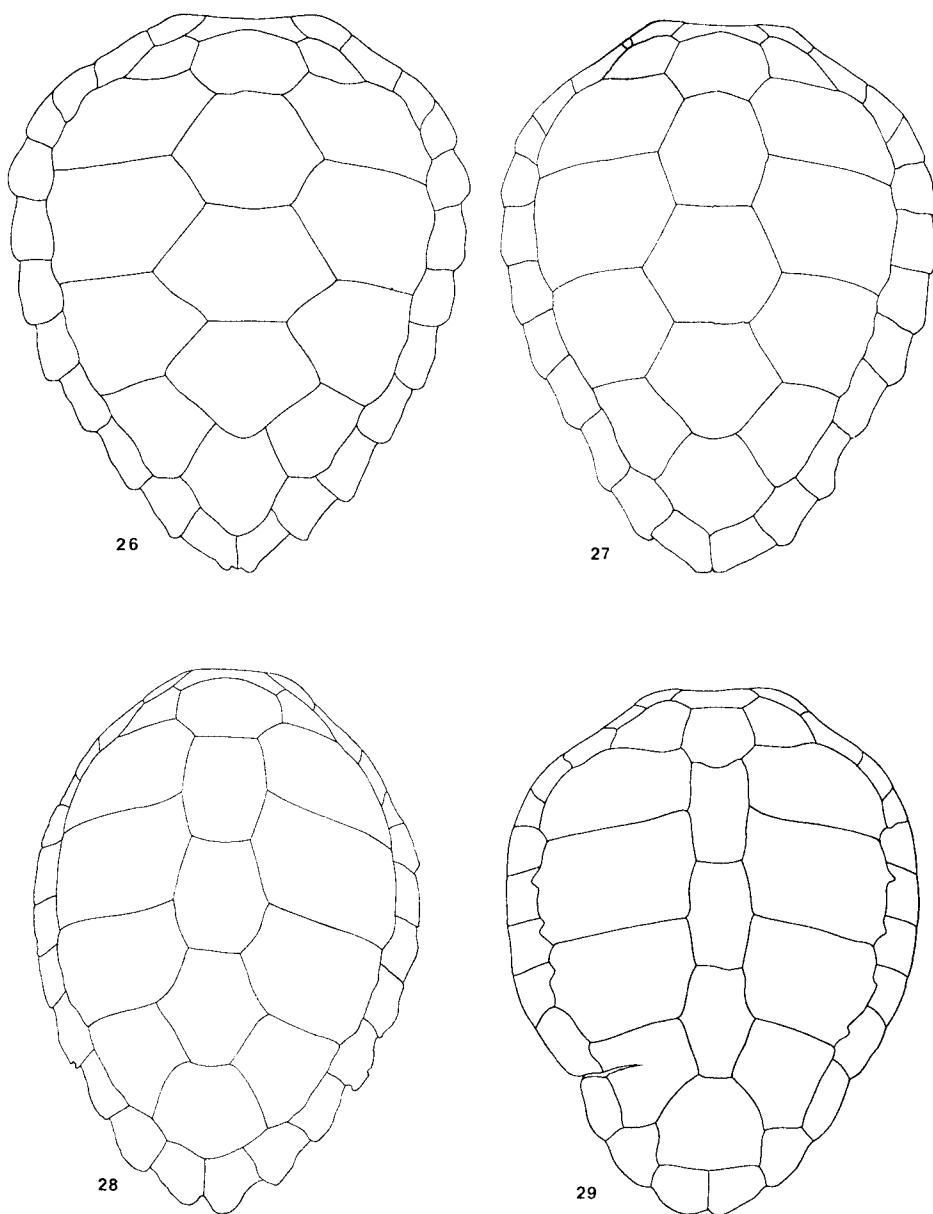
of a complete specimen. The loss of a flipper will have hampered the turtle in swimming and this may have hampered the turtle in obtaining food, but all this does not account for the very low weight. Fandard & Ranc (1912: 438; 1913: 741; 1940a: 237; 1940b: 238, *Thalassochelys caretta*) gave data upon the loss of weight in four Loggerheads due to fasting. A turtle with an initial weight of 13 kg had lost 8 per cent of its weight after six days of fasting; a turtle with a weight of 20 kg at the beginning of the experiment, after thirteen days of fasting weighed only 17.5 kg, i.e., a loss of 12.5 per cent. Two other Loggerheads of 13.750 kg and 14.500 kg respectively, after eighteen days of fasting had both lost 13 per cent of their weight. Of Ca 59 Van Lidth de Jeude (1895a: 212) gives the weight as having been 280 kg (616 lb); the length of the carapace is 965 mm in straight line and 1000 mm along the curve, and this places the turtle with Loggerheads weighing between 250 lb and 310 lb (113-141 kg). The specimen was a female containing 1150 eggs, the largest of which weighed 17.5 gr, and the smaller ones 11 gr; even if 13.3 kg or 39 lb (100 eggs of 17.5 gr and 1050 eggs of 11 gr) is deducted, it still remains highly improbable that Ca 59 was as heavy as indicated by Van Lidth de Jeude. Very probably the weight of this specimen was originally given in Dutch pounds (of 500 gr); in this way the turtle would have weighed 280 Dutch pounds, i.e., 140 kg or about 309 lb, which is a more likely weight.

Growth and Age. Very little is known about the growth of Loggerheads, and hence about the connection between the age of the specimen, the length of the carapace, and the weight of the turtle. Some data were published by Albert I (1898a: 10-11; 1932b: 279-281), G. H. Parker (1926: 422-423; 1929: 367-373), S. F. Hildebrand & Hatsel (1927: 376), Flower (1937: 14), Caldwell, Carr & Hellier (1956b: 298-299), Cadenat (1957b: 1372-1373), Uchida (1967: 500), and by Sachsse (1970: 89). The available data are all based upon specimens that were kept in captivity, and in some instances the circumstances may not have been ideal. In tables 13-15 some of the data from literature are given. As mentioned by Sachsse (1970: 91) differences in growth do occur, and these may be due to one juvenile obtaining a greater share of the food. In Sachsse's experiment the one juvenile prevented the other from taking food that had sunk to the bottom. Once the two juveniles were placed in separate tanks, the one with the retarded growth made up for 'lost time', and at the end of the first year the two juveniles were of about equal carapace length and weight. Competition in obtaining a share of the food may also be the cause of the differences in growth shown by Cadenat's three specimens. Of the three Loggerheads mentioned by Cadenat (1957b:

1372), at the age of 13 months and 3 weeks, the largest had a carapace length about 1.2 times that of the smallest; the weight of the largest was 1.75 times that of the smallest. G. H. Parker (1926: 423) refers to the weight of three turtles communicated to him by P. R. Stephenson; the three Loggerheads at the age of 4 months and 3 weeks were said to have attained a weight of 565 gr, 625 gr, and 1300 gr respectively. One wonders though whether the age mentioned can be correct; in just over one third of the time Stephenson's turtles would have reached a weight from 1.1 to 1.4 times that of Cadenat's much older specimens. A weight like that of Stephenson's smallest turtle (565 gr) was reached by Sachsse's (1970: 81) Loggerheads just after nine months of age.

The carapace is subject to allometric growth. In the hatchlings and in the juveniles the vertebral scutes are distinctly wider than long, but during growth the length increases relatively more strongly than the width; the difference between length and width gradually becomes smaller, and in the end the scutes become longer than wide (figs. 26-29). This change in the length/width ratio of the vertebrals does not affect all vertebrals at the same time and not to the same extent. In table 12 the length and width of the vertebrals are given for 27 loggerheads, which have been arranged according to increasing straight-line carapace length. From this table it is clear that the second vertebral is the first in which the length surpasses the width, and this occurs in specimens of which the carapace length is 345 mm or more. With regard to the reversal in the length/width ratio of the third vertebral there seems to be a kind of transition zone; the reversal may occur already in a specimen with the carapace 498 mm long, but not in a specimen of 500 mm, to be found again in all specimens of which the carapace has a length of 505 mm or more. A greater transition zone is found in the fourth vertebral; the reversal may be found in a specimen of 498 mm carapace length, not in specimens of 500, 505, 549 and even 641 mm, but one may find the longer scutes in specimens of 512, 568, 589, 625 mm, and the reversal is present in all specimens of 655 mm or longer. In the fifth vertebral a reversal of the length/width ratio is rare; it is found in a specimen with the carapace 641 mm long, and in one of 1020 mm. Only in one Loggerhead (carapace length 1020 mm) does the length of the first vertebral surpass the breadth.

In juveniles the vertebrals are distinctly keeled and posteriorly the keel of each vertebral ends in a kind of knob-like process, which is most distinct on the anterior vertebrals (Pl. 9). These keels and knobs are still distinct in specimens of which the carapace is one foot (305 mm) long. In specimens of about 350 mm the knobs tend to disappear, although the keels are still distinct. One may still find indications of weak keels on the first and/or



Figs. 26-29. *Caretta caretta* (L.), carapaces of different sizes, drawn to equal length, to show the changes in the shape of the vertebral and costal scutes. Length of carapace: fig. 26: 160 mm; fig. 27: 434 mm; fig. 28: 498 mm; fig. 29: 965 mm.

second vertebral in specimens up to 570 mm carapace length. In specimens of which the carapace is longer than 580 mm the keels have disappeared.

Various factors will influence the growth of Loggerheads, and one of these factors will be the kind of food offered to the turtles. Sachsse (1970: 89) fed his two hatchlings on octopus, shrimp, and marine fish, and apparently they thrived on this diet; in the beginning the food was presented to the juveniles by offering it to them by forceps. It is rather unlikely that a hatchling Loggerhead in nature will succeed in obtaining morcels of octopus, shrimp, and fish, and the growth of Sachsse's juveniles may have been much stronger than that, which would have taken place in fully natural conditions. The carapace length, which Sachsse's juveniles reached after one year, was reached by one of Cadenat's specimens only after thirteen months and three weeks; the two other juveniles mentioned by Cadenat after one year had reached a length corresponding to that of nine or ten months old hatchlings of Sachsse's experiment.

Although the growth in captivity may not be exactly like that in nature, it would nevertheless be worth while if aquaria would place on record data on the growth of Loggerheads (exact age, length and breadth of the carapace, weight, food provided to the turtles, temperature of the water, etc.).

One wonders what the growth of a young Loggerhead will be when it makes a long voyage across the ocean, whether it always will have a sufficient supply of food, and what the influence will be of the lower temperatures it will meet with in higher latitudes. Nothing is as yet known about this, but I believe that the Loggerhead, which is more a species of temperate zones than any of the other species, will suffer least from lower temperatures, but probably the rate of growth will be slowed down somewhat in winter.

From what has been mentioned above about the growth of young Loggerheads, and from what is known about the marked difference in size reached by turtles that originated from the same nest, it is clear that it is extremely difficult to estimate the age of the specimens found in European Atlantic waters. Still it is tempting to try and estimate the age of the juveniles, because this has a bearing on the time needed for a turtle to reach our waters.

The smallest Loggerhead recorded from European Atlantic waters is Ca 5, found on Vallay Island (Outer Hebrides) on November 26th, 1898. Its carapace had a length of 159 mm (measured along the curve). Comparing this measurement to those given by Sachsse, the Vallay Island Loggerhead would be ten months old at most; comparing the length to that of Cadenat's (1957b: 1372) specimens, the specimen could be between twelve to fourteen months old. Assuming that most, if not all Loggerheads found in European

Atlantic waters come from the Western Atlantic, another approach can be made to estimate the possible minimum age of the Vallay Island turtle, and this may help to estimate the age of other juvenile Loggerheads.

According to data given by Carr (1940: 107), Baldwin & Lofton (in: Caldwell, 1959a: 222), Caldwell, Carr & Ogren (1959: 296), and by Caldwell (1962a: 289) nesting takes place on the Atlantic coast of U.S.A. (Florida to North Carolina) from the last of April (Carr, 1940: 107) to about August 18th (Baldwin & Lofton, in: Caldwell, 1959a: 322). The incubation time is stated to vary from 49 to 62 days by Baldwin & Lofton (in: Caldwell, 1959a: 336); Caldwell, Carr & Hellier (1956b: 297) mention an incubation time extending to 68 days, but this pertains to somewhat unnatural circumstances of re-buried eggs. Using these data, the following extreme dates for hatching can be calculated. From eggs laid on April 30th, and with an incubation time of 49 days, the young would hatch on June 17th at the earliest. From eggs laid on August 18th, and with the maximum incubation time of 62 days the young would hatch on October 18th. It is clear that a juvenile Loggerhead cannot cross the ocean from the Florida-North Carolina area to Scottish waters in about five months, let alone in one month and eight days. Therefore, it is also clear that the Vallay Island turtle must have been born before October 18th of the year preceding the one in which it was found, and hence it would have been at least thirteen months and a week old. It must be remembered that the turtle, when found on November 26th, was dead. It is true that Peel (1899: 115) stated that it was just dead, but at that time of the year decomposition may have been delayed, and there is a chance that the turtle was just under thirteen months of age when it died. This would fit in nicely with its carapace length (cf. the three turtles of 12 months and 20 days, mentioned by Cadenat). It seems likely that a turtle, hatched late in the season (e.g., at the end of September, or in the beginning of October) might grow more slowly in the first months of its life than do turtles that are born in June or July, and it also seems likely that such a turtle will remain smaller than turtles of the same age but born in a more suitable season. Thus, a turtle born in June, or in the first half of July, might reach a length of about 185 to 200 mm at the age of 13 months, while turtles that hatched later in the season may reach about the same size at the age of 16 months. A turtle with a carapace length of 305 mm found in the beginning of July (such as Ca 30) may have hatched in the second half of July or the first half of August two years before and be about 23 months old, whilst another of the same size found towards the end of November (such as Ca 45) may have been born in the second half of September or the first half of October two years ago and be about 26 months old. To a certain extent the difference

in growth between turtles from the same nest, and hence of the same age, may obscure the picture, but it seems safe to conclude that most of the Loggerheads found in European Atlantic waters are between one and two years old. The statement that the fifty Loggerheads (Ca 88-Ca 137), received by the Musée de la Mer, Biarritz, weighed about 1 kg (2.3 lb), also points to these juveniles being between one and two years old. I avow that much of the above is sheer conjecture, but at the present stage of our knowledge it seems to give some idea of the time it takes a Loggerhead to cross the ocean from the Western Atlantic to European Atlantic waters. It would take juveniles between one and two years to complete the voyage (see also p. 244).

Sex. Of only nine out of the at least 164 Loggerheads recorded from European Atlantic waters, the sex has been indicated: Ca 13 and Ca 63 were males; Ca 2, 8, 30, 36, 59, 74, 172 were females.

Eggs. The largest ovarian eggs of Ca 2 measured only 2-2.5 mm. Ca 8 was found to contain 1020 eggs, the largest of which had a diameter of 28.6 mm. Ca 59 contained 1150 eggs, the largest of which measured 35 mm in diameter and weighed 17.5 gr.; the smaller eggs measured 25 mm and weighed 11 gr. Thus, none of the females contained eggs ready to be laid.

Food. Literature contains a number of references to the diet of the Loggerhead. Some of these are just general statements, at least in part based upon observations of others, and often only repeating the remarks made by previous authors. A survey of the information I found in literature may be given here in attempt to ascertain what the diet of this turtle is.

Catesby (1743: 40): "They feed mostly on Shell-fish; the great strength and hardness of their beaks enabling them to break very large shells, particularly the *Buccinum* pieces of which I have taken out of their stomachs; and have seen fractures upon large shells which the turtlers told me were caused by the bite of these Turtles."

Browne (1756) describes the stomach contents of a turtle captured off the Azores, many miles out at sea. Although Browne's description does not definitely exclude this turtle having been Kemp's Ridley (Brongersma, 1961: 9), it is more likely that it was a Loggerhead, a species known to be common off the Azores. The "guts were full of *Galatea's* and *Medusa's* which, with a few branches of some sea-weeds, made up all its nourishment." Although it seems unlikely that a Loggerhead would catch specimens of *Galatea* in the open ocean, we may take it that some species of crab had been eaten.

Audubon (1834: 374) wrote: "The Loggerhead feeds mostly on the fish

of conch-shells of large size; which they are enabled, by means of their powerful beak, to crush to pieces with apparently as much ease as a man cracks a walnut."

Holbrook (1842: 37) states that the Loggerhead "lives altogether on animal food; it is extremely voracious, and devours great quantities of shell-fish, as the various Buccinii and Trochi, especially a large conch (*Strombus*) which it breaks easily between its stout mandibles."

Garman (1883: vi, viii; 1884: 295-296) dealt twice with the food of the Loggerhead. In essence the statements are the same, and I quote from the second of them, which as is clear from Garman's paper is based upon information received from R. Kemp: "They eat sea-weed, crawfish, conchs, fish, a kind of sponge called Loggerhead sponge, and the Portuguese men-of-war. The latter, *Physalia*, are quite plentiful in the winter, and turtles of all kinds are very fond of them and are easily taken when eating. They shut their eyes to avoid the stings of the men-of-war, constantly using their flippers to brush them away" (Garman, 1884: 295), and: "My informant tells me the Loggerheads nip the smaller portion of the spiral from the large conchs, and in this way extract the animal" (1884: 296).

True (1884: 148) includes crabs, various shells, and fishes in the Loggerhead's diet: "It is said to be particularly fond of a large conch (*Strombus*) which it breaks with its powerful jaws and devours in great quantity."

Pouchet & de Guerne (1886: 878; 1940: 241-242) examined the stomach contents of Loggerheads captured in the Azores region during a cruise by Prince Albert I of Monaco. The account of the food of these turtles is of special interest as they were taken far from land and over deep water. The stomach of one Loggerhead contained: many specimens of the Pteropod *Hyalaea tridentata*; fragments of medusae; several Amphipods, *Hyperia medusarum*, obviously swallowed together with the medusae; remains of the crab *Nautilograpsus minutus*; bunches of the goose-barnacle *Lepas anatifera*; many Syngnathid fishes, *Entelurus aequoreus*, several of which had been partly digested already; many cinders, a piece of birch bark, some straws, and chips of wood. These last four items show that a Loggerhead will swallow about anything that is floating on the surface of the water. In this category also comes a piece of cork swallowed by another Loggerhead. Fragments of epithelium from the skin of turtles were attached to the bunches of goose-barnacles, showing that the Loggerheads (unwittingly) riddled each other from these cumbersome epizoans.

Pouchet & de Guerne state that, besides Syngnathids, other fishes are eaten as well. The stomachs of several Loggerheads contained fishes that were so fresh that they were turned over to the ship's galley. It is to be

regretted that the authors did not mention the species of fish found in the Loggerheads, nor the exact localities where these turtles were taken.

Except for general statements in literature that Loggerheads feed on fish (e.g., by Garman, 1883: vi; 1884: 295; True, 1884: 148; Pope, 1939: 285; Carr, 1952: 392; F. J. Schwartz, 1961: 37) there is very little evidence that they really do so. Layne (1952: 115) found vertebrae of two fishes in the stomach of a Loggerhead, but this turtle had been taken in a fish trap, and this may have been all that made it possible for the Loggerhead to catch the fish. In the annotated list of stations of the various expeditions by the Prince of Monaco (Richard, 1934) some stomach contents are mentioned for Loggerheads taken during later cruises. Thus, two Loggerheads taken on July 1st, 1895, in $37^{\circ}16'N$, $24^{\circ}44'45''W$ (Station 545), yielded the proostracum of a squid and unidentifiable objects (Richard, 1934: 277). Of thirteen Loggerheads taken between $38^{\circ}02'$ and $38^{\circ}04'N$, $25^{\circ}22'45''$ and $25^{\circ}34'45''W$, on July 15th, 1897 (Station 848), it was stated that the stomach of several of them contained pieces of pumice; it is suggested by Prince Albert I that the pumice was swallowed on account of the goose-barnacles attached to it. The stomach of a Loggerhead taken in $37^{\circ}20'N$, $21^{\circ}40'W$, on September 12th, 1904 (Station 1875) contained: slag, beaks of Cephalopods, fragments of the squid *Leachia*, specimens of the pelagic Gastropod *Ianthina*, and goose-barnacles.

Murray & Hjort (1912: 98) also dealing with the Loggerheads from the Azores region state that the stomach contents "consisted entirely of medusae and salpae, immense quantities of which floated near the surface of the sea."

That Loggerheads will eat Syngnathids is not very remarkable as these fishes do not swim very fast. Moreover, they may be present in large numbers North and North East of the Azores, and mass mortalities of these fish have been observed in the area (data and references in: Brongersma-Sanders, 1957: 988-989, fig. 7). One would like to know whether *Entelurus aequoreus* normally is present close to the surface in immense numbers. If so it is remarkable that it has not been found more often among the stomach contents of Loggerheads in the Azores region. If, however, it comes to the surface only under abnormal conditions, culminating ultimately in a mass mortality, other fishes might have been affected as well, and thus they might have become an easy prey for the Loggerheads. Heldt (1933: 33) remarked upon the inability of Loggerheads catching the fishes swimming quietly around them in an aquarium, although they sometimes bite rays and sand sharks that are lying peacefully on the bottom of the tank.

Until further evidence is provided I am loath to accept fishes, other than very slow moving species, as forming part of the normal diet of Loggerheads.

Bouvier (1906: 271) refers to two Loggerheads captured in the Azores region, and which were kept alive in the Prince of Monaco's ship by feeding them with pieces of meat, jellyfish, and *Nautilograpsus minutus*.

Nautilograpsus minutus having also been mentioned by Pouchet & de Guerne as a food item of the Loggerhead, one wonders whether the "*Galatea's*" mentioned by Browne (1756: 465) may not have been this species, which is often associated with floating objects, sea-weeds, and turtles.

Steuer (1905: 289, *Thalassochelys caretta*) stated that large, green balls of faeces of a Loggerhead from the Adriatic consisted almost exclusively of spicula of the sponges *Tethya lyncurium* and *Suberites*; besides, some scanty remains of sea urchins and pieces of *Flustra* were present. For this reference I am indebted to Dr. M. Boeseman, Leiden.

Fowler (1914: 4) found the intestinal tract of a Loggerhead, taken off the New Jersey coast, completely filled with remains of hermit crabs (*Pagurus pollicaris*) and borers (*Natica duplicata*).

R. C. Murphy (1914: 4) mentions the stomach of Loggerheads taken in the open sea in the South Atlantic Ocean to have contained *Velella*.

Babcock (1919: 352) states that the Loggerhead has been known to eat Blue Crabs (*Melitta*), and further he repeats the remarks by Holbrook (1842: 37), and those by Fowler (1914).

Babcock (1938: 596) writes about the Loggerhead: "It is more carnivorous in its diet than the Green Turtle and has been observed feeding on the Portuguese man-of-war and the large Bermudian conch (*Strombus gigas*), which it attacks by biting off the small end, extracting the animal through the opening. It also feeds on the so-called "Loggerhead Sponge"."

Pope (1939: 285-286) remarks: "Although always described as only "chiefly" carnivorous, I find no definite record of any plant food having been taken. Hermit crabs, shell-fish, and conchs (*Strombus*) are favourite articles of diet, but "Loggerhead sponge", the Portuguese man-of-war, borers (*Natica*), and fish are also eaten." The statement by Garman (1884: 296) and Babcock (1938: 596) about the biting off the small end of conchs is repeated.

Barbour (1943, fide Wangersky & Lane, 1960: 330; Barbour, 1945: 76) describes an enormous Loggerhead in Havana Harbour easing up to a Portuguese Man-of-War, closing its eyes, and nipping at it, thus confirming the statement by Garman (1883: viii; 1884: 295) about Loggerheads closing their eyes when eating *Physalia*.

Fraser & H. W. Parker (1949, 1953: 40) state the Loggerhead to feed on "molluscs, crustaceans, sea-urchins, etc., and sea-weeds may also be eaten."

Layne (1952: 115) enumerated the stomach contents of a Loggerhead taken in a fish trap near Woods Hole. These consisted of "portions of intact vertebrae of two fish about 4 or 5 inches long, several large pieces of the sulfur sponge (*Cliona celata*), remains of a spider crab (*Libinia*) with a carapace width of about 3 inches, some flesh, and several pieces of vegetation."

Lane (1960: 165-166) writes: "Fishermen occasionally observe the Loggerhead turtle seek out and devour a patch of these jellyfish Portuguese Men o'War that has been gathered by the wind; swimming at the surface, with its eyes often swollen nearly shut from the stings it has received, the turtle munches its way through the patch. The turtle must receive massive doses of toxin during such a feat, but it is undaunted by, or insensitive to, its discomfort."

F. J. Schwartz (1961: 37) states the diet of the Loggerhead to consist of crabs, shellfish, conchs, fish and jellyfish.

Wangersky & Lane (1960: 330) refer to *Caretta caretta* eating *Physalia* and *Veilella*; Halstead (1965: 312, 345) also mentions the eating of *Physalia*.

[Montoya] (1966: 24) states the diet of Atlantic Loggerheads to consist principally of crabs, oysters, and sea-urchins.

The contents of the gut of three specimens from Madeira were studied (Brongersma, 1968c: 131, 133) with the following results. In one specimen the stomach contained remains of salpae, and in the intestine bones of a very small fish and a shell of the Pteropod *Cavolinia tridentata* (Niebuhr) were found. The second specimen also contained remains of salpae, and some very small elliptical bodies were found that may have been nematocysts of a medusa. Moreover, the intestine contained a partly digested specimen of a small fish, *Macrorhamphosus gracilis* (Lowe). The stomach of the third specimen contained a piece of plastic, and in the intestine the remains of numerous goose-barnacles were found, together with small pieces of bark. It may well be that the bark was taken from a floating log to which the goose barnacles were attached. Probably the diet of this last specimen was still more varied; part of the contents of the intestine still await identification.

The fact that remains of fish were found in two of the three Loggerheads does not imply that these turtles actively hunt for fish. Small fish may be taken together with the medusae with which they are often associated, and the specimen of *Macrorhamphosus gracilis* may have been taken together with some floating seaweed.

To these remarks on the food of the Loggerhead in Atlantic waters some remarks upon the food of Indo-Pacific Loggerheads may be added.

For a Loggerhead taken in the Gulf of Mannar (Ceylon), Deraniyagala (1930: 81) mentions the stomach contents to consist of: "crabs, pieces of

coral, several squilla and the smashed up shells of mollusca." A second specimen from the same locality (Deraniyagala, 1939c: 180) had its stomach full of algae, and a third specimen had eaten: "large numbers of slow moving, sand burrowing crabs, e.g. *Dromia* and *Calappa* spp.; a fair amount of sand evidently ingested together with the crabs, parts of a half grown chank *Xanca rapa* including its entire opercle, several pearl oysters and specimens of the flat, thick shelled, sea urchin (*Clypeaster humilis*)."

Caldwell (1963: 569) found "several operculae of large specimens of the gastropod *Kelletia kelleti* Forbs" in the lower intestine of a Loggerhead taken in the Gulf of California.

Summarizing, we may state that on the high seas Loggerheads feed on Scyphomedusae, *Physalia physalis*, *Velella velella*, Salpae, Pteropods, *Ianthina*, *Nautilograpsus minutus*, *Lepas anatifera*, Squids (inter alia *Leachia*), Syngnathid fishes (*Entelurus aequoreus*), and perhaps also on other fishes see p. 158). When in shallow, coastal waters bottom dwelling organisms enter into the diet, such as crabs, hermit crabs, conchs, borers, sea urchins, and sponges. Apparently algae are sometimes taken in great quantity (Deraniyagala, 1939c: 180), and, when feeding at the surface sea-weeds will be taken together with other food. The turtles will swallow floating objects, sometimes inadvertently, sometimes because goose-barnacles are attached to these objects.

III. *Lepidochelys kempii* (Garman), Kemp's Ridley

Various English names have been used for this turtle: Mexican Loggerhead, Kemp's Loggerhead, Bastard Turtle, Mulatto Turtle, Kemp's Turtle, Atlantic Ridley, Mexican Ridley, Kemp's Ridley, etc.

To associate the name loggerhead with this turtle, may lead to confusion with the true Loggerhead (*Caretta caretta* (L.)). The names Bastard Turtle and Mulatto Turtle imply that it is a hybrid between two other species of turtle, and indeed such it was erroneously believed to be by some American fishermen. The name Atlantic Ridley should be avoided, because this might be taken to indicate that only this one Ridley species is to be found in the Atlantic Ocean. However, it has been well established by now that another species, the Olive Ridley (*Lepidochelys olivacea* (Eschscholtz)) also occurs in the Atlantic, be it farther to the south (West Coast of Africa, Guianas, Venezuela, Trinidad). The name Mexican Ridley might be used to stress the fact that the only known nesting beaches are to be found on the shores of the Gulf of Mexico, but the use of this vernacular name might also give the erroneous impression that the species occurs in Mexico only. Therefore, I decided for Kemp's Ridley, which name provides a link with the scientific

name, and which does not imply anything as to the geographical distribution of the species.

In Mexico the species is known as *Tortuga lora*, and should it be found one day in Spanish waters, as will be certainly the case, this name could be applied to it.

Some authors (e.g., Wermuth & Mertens, 1961: 242) consider *kempii* to be a subspecies of *olivacea*. For the present I believe that the available evidence (inter alia, in the unpublished thesis of Dr. P. C. H. Pritchard, 1969a) is more in favour of recognizing it as a separate species.

In Europe the species has been recorded from Eire, Great Britain (Scotland, England, Wales, Channel Islands), The Netherlands and France. It has once been found in the Azores (Deraniyagala, 1939a), and three specimens are known from Madeira (Brongersma, 1968c: 133; 1968e: 69; 1968h: 439).

General references to the occurrence of Kemp's Ridley in European Atlantic waters are given by:

Mertens & Wermuth (1960: 72): *Lepidochelys olivacea kempii*;
Peters (1967: 384): *Lepidochelys olivacea kempii*.

III A. List of records of *Lepidochelys kempii* (Garman)

GREAT BRITAIN and IRELAND

The species has been mentioned as occasionally occurring in British and/or Irish waters, inter alia, by:

Editors (1938), Pope (1939, 1967: 289): *Colpochelys kempii*(i);
Anonymus (1939a, b): Kemp's Loggerhead;
Mertens & Müller (1940: 21), Matthews (1952: 29): *Caretta kempii*;
Stejneger & Barbour (1943: 211), Fraser & H. W. Parker (1949, 1953: 42), Carr (1952: 396; 1955: 148; 1956, 1963a: 15; 1963b: fig. 2; 1967c, 1968: 124, 125, 147, 149, 222), Noël-Hume (1954: 104), Pope (1956: 396), Mowbray & Caldwell (1958: 147), Carr & Goin (1959: 249), Brongersma (1966: 52; 1967a: 3, 14; 1967b: 395; 1967c: 7; 1968h: 439; 1970a: 72), M. [A.] Sm[ith] [&] A. d'A. B[ellairs] (1967: 312): *Lepidochelys kempii*(i);
Deraniyagala (1943: 82), Aguayo (1953: 211), Carr (1955: 151), Hellmich (1956: 88; 1962: 84), Neill (1958: 29), Villiers (1958: 186), Pasteur & Bons (1960: 100), Mertens (1960a: 48; 1960b, 1964, 1968a: 24), [Montoya] (1966: 33), Leutscher (1966: 73): *Lepidochelys olivacea kempii*(i);
Barbour (1945: 77): *Thalassochelys kempii*;
A. H. Clark (1948: 424): Lesser Loggerhead, west Atlantic race;
Mertens (1952: 24): *Caretta olivacea kempii*;
M. A. Sm[ith] (1955: 550): Kemp's Turtle;
L. H. N. Cooper (1961: 225): Kemp's Loggerhead turtle.

Burton (1961a: Ridley or Kemp's Loggerhead) mentions the species from Southwest England, Wales, Hebrides, and Shetland. I have not been able

to trace any ridley records from the Hebrides and Shetland; probably Burton confused statements about the occurrence of turtles in general (or of the Loggerhead) with those of Kemp's Ridley.

GREAT BRITAIN

SCOTLAND

Le 1, 2.x.1949, alive, Loch Clash (part of Loch Inchard), by Kinlochbervie (Sutherland). RSM 1950.1, presented by Mr. R. Neilson.

M. A. Smith (1951, 1954, 1964, 1969: fig. 84): *Caretta kempi*³).

Stephen (1953: 109, 113), Taylor (1963: chart 8): *Lepidochelys kempi*(i).

Carapace, long 11½ inches (292 mm).

Le 2, 26.xii.1949, alive, Troon (Ayrshire). Museum and Art Galleries, Paisley, 18/1949.

M. A. Smith (1951, 1954, 1964, 1969: fig. 84): *Caretta kempi*.

Stephen (1953: 109, 113), Taylor (1963: chart 8): *Lepidochelys kempi*(i).

Carapace, long 8½ inches (216 mm), wide 7¾ inches (197 mm); length from beak to posterior tip of carapace 12¼ inches (311 mm).

The turtle was washed ashore during very stormy weather.

WALES

The two specimens, upon which the records Le 3 and Le 4 are based, were sent on loan to Dr. H. W. Parker, British Museum (Natural History), who identified them. When received in London the specimens bore the registration numbers 31-1 and 31-3 (NMW), but there was no indication as to which specimen came from Mochras Island, and which from Freshwater West. Therefore, I could not link up the registration numbers with my record numbers.

The carapace of the one is 298 mm long, and 284 mm wide; that of the other is 210 mm long, and 204 mm wide.

Le 3, 22.xi.1930, alive, Mochras Island (Merioneth). NMW.

"Cambrian News", 28.xi.1930: *Chelonia imbricator* (fide Forrest, 1931a).

Forrest (1931a: 26-27; 1931b: 15): *Chelonia imbricata*.

Taylor (1948: 11, 26; 1963: chart 8): *Lepidochelys kempi*.

M. A. Smith (1951, 1954, 1964, 1969: fig. 84), Matheson (1960: 989): *Caretta kempi*.

3) Although the name *Caretta kempi* was changed to *Lepidochelys kempi* in the text of the 1964 and 1969 editions of Smith's book (p. 266), the explanation of fig. 84 still mentions *Caretta kempi*.

Le 4, 14.xii.1930, alive, Freshwater West (Pembroke). NMW.

Taylor (1948: 11, 26; 1963: chart 8): *Lepidochelys kempi*.

M. A. Smith (1951, 1954, 1964, 1969: fig. 84), Matheson (1960: 989): *Caretta kempi*.

Le 5, 3.i.1960, dead, Kenfig Dunes (Glamorgan). NMW.

Matheson (1960: 989): *Caretta kempi*.

Cutcliffe (1968: 375): *Lepidochelys kempi*.

Carapace, long 244 mm, wide 224 mm; weight 2.42 kg.

ENGLAND

Le 6, 26.xi.1967, dead, Woolacombe Sands (Devon). Ilfracombe Museum.

Mr. W. A. Dodge (in litt.).

Cutcliffe (1968: 375), Brongersma (1970a: 72): *Lepidochelys kempi*(i).

The turtle was first reported as being a Hawksbill, but later it was identified as Kemp's Ridley by Miss B. A. Brindley, of the British Museum (Natural History).

Carapace, long 12 inches (304 mm), wide 11½ inches (292 mm).

In the gut a small fragment of a barnacle and some fragments of a bivalve shell (possibly *Cyprina*) were found (Dr. W. Vervoort, Leiden). These fragments may have been taken as such from the bottom, or they may be remains of food.

Le 7, 3.i.1943, Polzeath (Cornwall). BM 1945.11.8.2, presented by Receiver of Wreck.

M. A. Smith (1951, 1954, 1964, 1969: fig. 84): *Caretta kempi*.

Brongersma (1961: 33), Taylor (1963: chart 8): *Lepidochelys kempi*(i).

Carapace, long 241 mm, wide 226 mm.

Le 8, 17.xii.1949, alive, Treyarnon Beach, 4 miles SW of Padstow (Cornwall), BM 1950.1.1.28, presented by Mr. D. P. Wilson.

Brongersma (1961: 33), Turk & Penhallurick (1966: 6): *Lepidochelys kempii*.

Hillaby (1963: fig. 3): Loggerhead turtle (lapsus).

Carapace, long 250 mm, wide 229 mm.

Le 9, ii.1969, dead, Penhale Point, near Perranporth (Cornwall).

BM 1971/1677, skeleton.

Miss A. G. C. Grandison (in litt., 19.ii.1969).

Brongersma (1970a: 72): *Lepidochelys kempii*.

Carapace, long 267 mm, wide 252 mm.

Five vertebrae and five pairs of costals; right 12, left 13 marginals;

four inframarginals on either side; inframarginal pores present. Two pairs of prefrontals, in contact medially; one large inframandibular scale.

The turtle was dead when found; both fore flippers and the left hind-flipper had been torn off; right hind flipper with two claws.

Colour of carapace: blackish brown.

Le 10, 30.xii.1938, alive, Portreath Beach, NW of Redruth (Cornwall). BM 1940.3.14.1, purchased of Mrs. E. Pryor.

"The Times", 3.ii.1939: 9, col. 1: Kemp's Loggerhead.

H. W. Parker (1939b: 127), M. A. Smith (1951, 1954, 1964, 1969: fig. 84): *Caretta kempi*.

Taylor (1948: 11, 26; 1963: chart 8), Brongersma (1961: 33), Turk & Penhallurick (1966: 6): *Lepidochelys kempi*(i).

Carapace, long 235 mm, wide 213 mm.

Le 11, 1925, Isles of Scilly (Cornwall). BM 1925.12.13.1, presented by H. Brit. M. Coastguard.

"The Times", 16.i.1939: 9, col. 4: Kemp's Loggerhead.

Deraniyagala (1943: 82, fig. 6c): *Lepidochelys olivacea kempi*.

Taylor (1948: 11, 26; 1963: chart 8), Brongersma (1961: 33), Turk & Penhallurick (1966: 6): *Lepidochelys kempi*(i).

M. A. Smith (1951, 1954, 1964, 1969: fig. 84): *Caretta kempi*.

Carapace, long 257.5 mm, wide 229 mm.

Flower (1933: 751) mentions *Caretta caretta* as having been found in the Scilly Isles; apparently, the record is based upon the present specimen, which at that time had not yet been identified as being *L. kempii*.

Le 12, 8.xi.1947, alive, Newlyn Harbour (Cornwall). BM 1947.3.3.2, received from the Zoological Society of London.

Brongersma (1961: 33, 35), Taylor (1963, chart 8), Turk & Penhallurick (1966: 6): *Lepidochelys kempi*(i).

Carapace, long 346.5 mm; wide 336 mm.

Le 13, ♀, 1913, alive, Malpas, near Truro (Cornwall); County Museum, Truro, received from Mr. Geo Penrose.

Anonymus (1914: 338): Loggerhead Turtle.

Turk & Penhallurick (1966: 6, fig. on p. 8): *Caretta caretta*.

R. D. Penhallurick (in litt., 13.x.1970): Kemp's Ridley.

The following information was provided by Mr. Penhallurick.

Carapace, long 265 mm, wide 250 mm. Five vertebrals and five costals on either side; 14 marginals on the left side, and 13 on the right; four inframarginals on each side; pores indicated, but not very distinct in the

stuffed specimen of which the ventral surface has been plastered and painted. The two pairs of prefrontals form a suture over their whole length.

The darker parts of the carapace are burnt umber in colour.

Le 14, 28.i.1939, dead, Pagham Beach (Sussex). BM 1940.3.13.1, presented by Mr. V. H. Vick.

"The Times", 3.ii.1939: 9, col. 1: not yet identified.

H. W. Parker (1939*b*: 127), Smith (1951, 1954, 1964, 1969: fig. 84): *Caretta kempi*.

Taylor (1948: 11, 26; 1963: chart 8), Brongersma (1961: 33): *Lepidochelys kempi(i)*.

Carapace (skeleton), long 218.5 mm, wide 219 mm.

CHANNEL ISLANDS

Le 15, 10.xii.1938, alive, Beaumont Beach, Jersey. BM 1950.1.2.70, found by Miss E. N. Moignard, presented by Mr. H. J. Baal.

Baal (1938, 2 figs.): Loggerhead.

Baal (1939: 359, 3 figs. on 2 pls.): *Caretta kempi*.

Taylor (1948: 11, 26; 1963: chart 8), Frazer (1949: 51), Brongersma (1961: 33, 35; 1970*a*: 72): *Lepidochelys kempi(i)*.

Carapace, long 253 mm, wide 226.5 mm.

The turtle was at first believed to be a Hawksbill (cf. Baal, 1938). A cluster of goose-barnacles was attached to the shell.

EIRE

Le 16, late x, or early xi.1934, Galway Bay. NMI 108: 1934.

Anonymus (1935: 36): Loggerhead Turtle.

Deraniyagala (1938*a*: 66, 69, fig. 1; 1938*b*: 540): *Colpochelys kempi*.

"The Times", 16.i.1939: 9, col. 4; Kemp's Loggerhead.

Carr (1942: 11), Taylor (1963: chart 8), O'Riordan (1969: 206): *Lepidochelys kempi(i)*.

Praeger (1950: 206): *Lepidochelys olivacea*.

M. A. Smith (1951, 1954, 1964, 1969: fig. 84): *Caretta kempi*.

A. Hardy (1959, 1964: 260): *Lepidochelys* (= *Colpochelys*) *kempi*.

Carapace, long 245 mm, wide 247 mm (J. S. Jackson, in litt., 24.ix.1965); Deraniyagala gave the width as being 236 mm.

Le 17, xii.1941, Galway Bay. NMI 49: 1941.

J. S. Jackson (in litt., 24.ix.1965), O'Riordan (1969: 206): *Lepidochelys kempi*.

Carapace, long 280 mm, wide 277 mm.

Le 18, 1928, Miltown Malbay (Co. Clare). NMI 92: 1928.

Deraniyagala (1938*a*: 66, 69, pl. 2; 1938*b*: 540): *Colpochelys kempi*.

"The Times", 16.i.1939: 9, col. 4: Kemp's Loggerhead.

Carr (1942: 11), Taylor (1963, chart 8), O'Riordan (1969: 206): *Lepidochelys kempi*(i).

Praeger (1950: 206): *Lepidochelys olivacea*.

M. A. Smith (1951, 1954, 1964, 1969: fig. 84): *Caretta kempi*.

A. Hardy (1959, 1964: 260): *Lepidochelys* (= *Colpochelys*) *kempi*.

Carapace, long 252 mm, wide 233 mm.

Le 19, 17 or 27.i.1921, dead, Valentia Island (Co. Kerry). NMI 14: 1921.

Scharff (1921: 29): *Thalassochelys caretta*.

Delap (1924: 6): Loggerhead Turtle.

Praeger (1950: 206): *Caretta caretta*.

J. S. Jackson (in litt., 24.ix.1965), O'Riordan (1969: 206): *Lepidochelys kempi*.

Carapace, long 245 mm (Jackson; 9¾ inches Scharff); wide 222 mm (Jackson; 9 inches Scharff); total length 13¼ inches (336 mm), Scharff; weight 4 lb 7 oz. (2.013 kg).

Scharff (1921: 29) gives September 17th, 1921, as the date; Delap (1924: 6) mentions September 27th, 1921.

Le 20, i.1921, dead, Pulleen Harbour, Bantry (Co. Cork).

Dennehy (1921: 175): Loggerhead Turtle.

Editor, Postscript to Dennehy (1921: 175): probably *Chelonia caretta*.

Scharff (1921: 30): *Thalassochelys caretta*.

Delap (1924: 6): Turtle.

O'Riordan (1969: 206): *Lepidochelys kempi*.

Dennehy (1921: 175) writes: "The back was nearly black." This, in my opinion, shows this turtle to be Kemp's Ridley. A blackish colour I have observed in other specimens of *Lepidochelys kempii* (e.g., in that from Newlyn, Le 12), but never in a Loggerhead. Moreover, I believed that the relative measurements (length as compared to width of the carapace) gives a further indication to its being Kemp's Loggerhead. Dennehy states that it "measured 13 in. in length, and 9 in. across the back. The front flippers when extended 15½ in., and the neck and head 4½ in." The length of 13 inches (330 mm) I take to be the total length for the following reasons. The measurements (total length 13 inches, width 9 inches) compare well with those of another specimen (Le 19: total length 13¼ inches, width 9 inches). If the length mentioned by Dennehy was that of the carapace, the width/length ratio would be too low, even for a Loggerhead. Using the formula introduced by Carr & Caldwell (1956: 20) to express the relation between weight and length of the carapace, a specimen with a carapace 13 inches long would have a weight of about 12 lb, whilst Dennehy mentions his specimen to have weighed 3½ lb. This weight would correspond to a length of the carapace of slightly under eight inches, and this comes more close to that of the specimen if the length of head and neck (4½ inches) is sub-

stracted from the total length of 13 inches. The carapace then would be $8\frac{1}{2}$ inches (216 mm) long. If it is accepted that the length of the carapace is 216 mm, the shell must have been distinctly wider than long (width 9 inches or 228.5 mm). It is known that the carapace may be wider than long in *Lepidochelys kempii* (Carr & Caldwell, 1956: 21), but not in the Loggerhead. However, it is not known whether Dennehy took his measurements in a straight line (between perpendiculars) or along the curve. The influence of the curve is greater on the width of the carapace than on its length, because the transverse curve is more strongly marked than the longitudinal curve. Comparison of the straight to the curved measurements in a Dutch specimen of *Lepidochelys kempii* (Le 23) shows that the shell is wider than long when the curved measurements are used, but longer than wide when measured in a straight line; in specimens of *Caretta caretta*, of about equal size to the turtle measured by Dennehy, the length always exceeds the width, whether the measurements are taken along the curve or in a straight line. Having in mind the possibility that Dennehy used the width taken along the curve, I have tried various ways to estimate the width such as it would be when measured in straight line. The result is that in any case the width/length ratio in Dennehy's specimen is higher than that of the Loggerhead, but that it comes within the range of variation of *Lepidochelys kempii*; this I consider an additional argument to refer this turtle to *Lepidochelys kempii*.

Le 21, 22.xii.1968, dead, Whitewaterbrook beach, about $\frac{1}{4}$ mile north of Bailey Lighthouse, Howth (Co. Dublin). NMI 49: 1968, presented by Mr. J. Norman Wilkinson.

O'Riordan (1969: 206), Brongersma (1970a: 72): *Lepidochelys kempii*.

Carapace, long 222 mm, wide 198 mm.

These measurements were taken by me from the preserved specimen, in which the horny scutes had worn off; the measurements of the living specimen may have been a fraction greater. My measurements differ somewhat from those given by O'Riordan (1969: 206), a not unusual fact when a specimen is measured by two different people. Expressed in inches, I measure the carapace to be $8\frac{3}{4}$ in. long, and $7\frac{13}{16}$ in. wide. The difference between our measurements as expressed in the metric system, may be partly explained by O'Riordan taking the inch to be equal to 23 mm, whilst in fact it is 25.4 mm.

Five vertebrae and five pairs of costals; 13 marginals on either side; on the right side four inframarginals; on the left side three inframarginals, followed by a smaller shield that does not reach the abdominal and femoral scutes; inframarginal pores present. Fore and hind flippers each with two claws.

The bony carapace is cracked, and this makes it difficult to be certain about the number of neural bones. As far as this could be ascertained there are eleven neurals, divided in an anterior series of eight, and a posterior series of three bones; the two series separated by one pair of costals forming a median suture.

THE NETHERLANDS

Le 22, 21.xii.1970, alive, island of Terschelling, at KM 11 (Midsland); RMNH 16700, purchased of Mr. Remmert Ruyg.

De Feyfer-Teutelink (1971: 7, 2 figs): *Lepidochelys kempi*.

Five vertebrae and five pairs of costals; 13 marginals and four infra-marginals (with pores) on either side; the vertebrae are keeled, the keel on the second vertebral is especially strong. Two pairs of prefrontals with a median suture over their whole length; each posterior prefrontal with an incisure proceeding from the frontal. One large inframandibular scale on either side, that on the right side with an incisure at its lower border. Two small intergulars, the right somewhat larger than the left. Fore flippers with two claws; distally of the claws one scale on the outer border of the flipper has a small but distinct horny projection which gives the impression of a third claw being present, but this projection is in no way connected with the tip of a phalange.

Carapace, long 232 mm, wide 218 mm.

Colour of carapace blackish, with a few light areas where barnacles had been attached. A cluster of goose barnacles was present close to the rear border of the carapace, but these were removed and thrown away by Mr. Ruyg when he found the turtle on the beach. The skin of the head shows two oval wounds; it is possible that here too barnacles were attached. The turtle was kept alive for a few days; it died of the cold on December 24th, 1970, when it was taken to Leiden.

Le 23, 4.xii.1954, alive, Scharendijke, island of Schouwen. RMNH 10676, received from the Zoological Gardens, Rotterdam.

"Het Vrije Volk", 11.xii.1954, fig.

Swennen (1955: 30): *Thalassochelys caretta*.

Brongersma (1961: 33, 35, fig. 8b, 9; 1968h: 440 fig. 1): *Lepidochelys kempi*(i)

The turtle was stranded alive, but apparently it was exhausted and benumbed, and the wind covered it with sand. Attention was drawn to it by a dog, which recognized it for something alive (J. Viergever, in litt., 15.i.1966).

Carapace, long 266 mm, wide 245 mm.

FRANCE

Carr (1955: 149, *Lepidochelys olivacea kempfi*; 1956, 1963a: 15, *Lepidochelys kempfi*) mentioned the occurrence of Kemp's Ridley in southern France, and the same author (Carr, 1967c, 1968: 125, 147, 149, 155, Atlantic ridley) refers to its having been found on the French coast. It may be that in these instances the reference was based upon the single record (Le 15) from Jersey (Channel Islands), which lies fairly close to the French coast. However this may be, two specimens truly from the French coast have now become known.

Le 24, date?, Les Portes, île de Ré (Charente-Maritime), leg. Mr. Gazin. Musée de la Mer, St. Clément-des-Baleines, île de Ré.

Brongersma (1970a: 72): *Lepidochelys kempii*.

Carapace, long 267 mm, wide 249 mm.

Five vertebrals, five pairs of costals; 13 marginals and four inframarginals on either side; inframarginal pores present. Two pairs of prefrontals, medially in contact; one large inframandibular scale on either side.

The colour of the carapace of this stuffed specimen is yellowish-brown.

Le 25, 1926, St. Jean-de-Luz (Basses-Pyrénées), leg. Mr. Elisalt. Muséum d'Histoire Naturelle, Bayonne.

Brongersma (1968h: 439; 1970a: 72): *Lepidochelys kempfi(i)*.

Carapace, long 292 mm; wide 270 mm.

Six vertebral scutes; five costal scutes on either side. Fourteen marginals on either side. The stuffed specimen has been glued to a piece of board, and this made it impossible to examine the plastron completely. However, it could be ascertained that there are four inframarginals on the right side, and that inframarginal pores are present. Two pairs of prefrontals, those of the left and right forming a median suture over their whole length.

III B. *Lepidochelys kempii* (Garman). Discussion

The occasional occurrence of *Lepidochelys kempii* in European Atlantic waters was demonstrated for the first time by Deraniyagala (1938a, b). Fraser & H. W. Parker (1949, 1953: 40, 42) suggested that a number of records ascribed to *Caretta caretta* might in fact have been based upon misidentified specimens of *Lepidochelys kempii*; this would apply especially to records from the time before *L. kempii* was described in 1880, and to records from before 1938 when Kemp's Ridley had not yet been shown to

reach Europe and during which period *kempii* was often considered a synonym of *caretta* (see also p.). Indeed a number of such records are known. From the northern area Le 11, Le 13, Le 19, Le 20, and Le 23 were originally reported to have been Loggerheads, and from the central area two specimens labeled as being Loggerheads (Le 24, Le 25) were present in French collections. One specimen (Le 3) was at first believed to have been a Hawksbill. Re-examination of specimens in collections and a survey of the literature have shown that *L. kempii* had been found in British waters (Cornwall) already in 1913 (Le 13), but no specimens from before that year could be traced (fig. 34). In European Atlantic waters *L. kempii* has been found in the northern and central areas, but not yet in the southern area; one day it will certainly turn up in Spain and Portugal.

The records of *L. kempii* have been arranged chronologically in table 2, and these data have been recapitulated in table 3a and 3b. The number of specimens is so small that no conclusions can be drawn from the fluctuations in the number over the decennia.

Live Kemp's Ridleys have been recorded from the months of October, November, and December (table 16) with a definite peak in December (fig. 40). Of five specimens it is not known whether they were alive or dead when found; of three of these specimens the time of the year has been indicated (Le 7, 16, 17); of one specimen (Le 11) the date of registration in the British Museum (Natural History), December 13th, 1925, rather suggests that this turtle was found either towards the end of November or in the beginning of December. Of two specimens, viz., of one found alive (Le 13) and of one of which it is not known whether it was alive or dead (Le 18), there is no indication at all about the time of the year in which they were found. Of the two specimens from the central area it is neither known whether they were alive or dead, nor in which month they were found.

From these data it is evident that *L. kempii* is found in the northern area during a much more limited period than *C. caretta*. As yet live specimens have been not found after December, but the fact that a dead specimen has been recorded from February makes it likely that occasionally a live Kemp's Ridley will be met with in January. It is assumed that Kemp's Ridley, like the Loggerhead, will suffer from the cold when in winter the temperature of the surface water goes down, and that gales and storms drive the more or less weakened and benumbed turtles to the coast, where they are stranded alive or dead.

In a way it is rather astonishing that Kemp's Ridley is so hardy a species that live specimens are still found in our area at the end of December. While the Loggerhead is known to breed on the East coast of U.S.A. as far north

as about 35°N, Kemp's Ridley has its nesting beaches much farther to the South on the coast of the Gulf of Mexico in northern Mexico and the southern most part of Texas. From the Gulf of Mexico specimens of Kemp's Ridley pass through the Florida Straits into the Atlantic Ocean to wander northward along the American East coast as far as Nova Scotia, and some of them go even farther, to the Azores, to European Atlantic waters, and even to Madeira. The European Atlantic records have been given above, those from Western Atlantic waters, from the Azores and Madeira have been included in Appendix 1. There, the possible occurrence in the Mediterranean of *L. kempii* is discussed. Dunn (1918b: 75, *Caretta kempii*) referred the skull of a turtle, said to have been brought to Jamaica alive in 1894, to Kemp's Ridley. Other authors seriously doubt whether *L. kempii* ever does occur somewhere near Jamaica, and one should consider the possibility that the skull derived from a specimen of *Lepidochelys olivacea* (Eschscholtz) a species that is known to occur in the Guianas, Venezuela, and Trinidad, with migrants or stragglers reaching Brazil, Puerto Rico and Cuba (see Appendix 2), and which may occasionally reach other islands in the Caribbean area. Sometimes they seem to migrate in fairly large schools. Carr (1957: 53) refers to such a migration observed by Mr. James McInnis, of Woods Hole Biological Laboratory, who picked up some specimens from dozens of carcasses on the beach at Woods Hole, after a whole fleet of such turtles had travelled from Buzzards Bay to Vineyard Sound and then headed out to the sea. No date is mentioned, but at the time Carr was informed about this event, the turtles were stated to be twenty year old as museum specimens, and, therefore, the migration must have taken place in the 1930's.

It is interesting to note that Dodge (1944: 121) states that in Massachusetts waters Kemp's Ridley is more common than the Loggerhead, and this seems also to be the case in Nova Scotia as follows from the data given by Bleakney (1965: 125, table 4). Sumner, Osburn & Cole (1913: 774; R. C. Murphy, 1916: 58) state that *Eretmochelys imbricata* is more common in the vicinity of Woods Hole than the Loggerhead. This seems hardly likely, and I suppose that the "*Eretmochelys imbricata*" of these authors are in reality specimens of *Lepidochelys kempii*.

Summarizing it can be stated that *L. kempii* breeds in the Gulf of Mexico, and as far as we know only there. All specimens found along the north American East coast, in European Atlantic waters, in the Azores and off Madeira must have come from the Gulf of Mexico. The fact that in American Atlantic coastal waters *L. kempii* seems to be more common than *C. caretta* may perhaps be explained by *C. caretta* being a more oceanic species, the young of which at a very early age already move out into the open ocean,

while *L. kempii* tends to keep to shallower water, closer to the coast. This may be one of the reasons too that fewer Kemp's Ridleys than Loggerheads reach European Atlantic waters. Another reason may be that the nesting beaches of *L. kempii* are father away from Europe.

Size. The length of the carapace of the specimens found in European Atlantic waters varies from 210 mm (not 197 mm as stated by me in an earlier paper) to 346.5 mm. In fig. 42, the specimens have been arranged in size classes, each of 25 mm range of carapace length. Comparison with *C. caretta* shows that the Kemp's Ridleys although decidedly being young specimens, on the average are somewhat larger than the youngest Loggerheads. This may be due to a slightly higher age, Kemp's Ridley having to cover a greater distance before reaching Europe. In table 17 the length and width of the carapace, and the length/width ratio is given for the specimens from the Eastern Atlantic Ocean (European Atlantic waters, Azores, Madeira) as well as for a number of specimens from the United States of America. Only two European specimens (Le 14, Le 16) and one from U.S.A. (AMNH 69604) have the carapace wider than long. Anonymus (1966b) gives the length of 287 adult females from Mexico as varying from 54.5 cm to 75 cm; Chávez, Contreras & Hernández (1967: 13) give the length for 203 adult females as ranging from 595 to 750 mm. Therefore, the specimens from European Atlantic waters must be classified as being young to about half-grown. Only one specimen from Madeira (MMF 3194) with the carapace 570 mm long, comes within the range of variation given by Anonymus (1966b), but it remains under the minimum given by Chávez, c.s. (1967); this Madeiran specimen will have been almost adult.

Information about the growth of Kemp's Ridley is even more scanty than that about the growth of the Loggerhead. Fugler & Webb (1957: 108) recorded four hatchlings, but of these only the average length was mentioned. The specimens were also examined by Carr & Caldwell (1958: 254, 258, 359), who state the length of the carapace to be 43.5 mm, 43.2 mm, 41.2 mm, and 41.8 mm respectively. Werler (1951: 47) states that in captivity, four juveniles of 120 days old had attained a carapace length of 105 mm, 107 mm, 119 mm, and 121 mm respectively. This indicates a stronger initial growth than in the Loggerhead. In Sachsse's (1970: 89; my table 13) experiment such a length was reached by two Loggerheads only after between five and seven months, and Cadenat's (1957b: 1372; present paper, table 13) reached such a length only after between nine and ten months. If the rate of growth observed by Werler is the normal one for Kemp's Ridley, the young specimen from

the Azores recorded by Deraniyagala (1939*a, b*) with the carapace 99.7 mm long, must have been just under four months of age⁴).

Mowbray & Caldwell (1958: 147) refer to a Kemp's Ridley from Bermuda, which was captured on March 31st, 1949, and which at the time was found to weigh 15 lb. It was weighed again in mid August, 1957, and then it had attained a weight of 40 lb. This time it was also measured; the length of the carapace was 18½ inches (470 mm), its width 18¾ inches (476 mm). Using the data on the length-weight relationship published by Carr & Caldwell (1956: 20-23), Mowbray & Caldwell calculate that the Bermuda turtle must have been about 14 inches (356 mm) long when it was captured; in eight years and three and a half months it would have grown about 114 mm. However, this is far from certain. The formula for the length-weight relationship (Carr & Caldwell, 1956: 20) holds good only for specimens of which the carapace is longer than wide. Carr & Caldwell (1956: 23, table 5, note *b*) give an example of a small specimen that has the carapace wider than long, and of which the actual weight greatly exceeds that calculated from the length (length of shell: 10¼ inches; actual weight: 7.0 lb.; calculated weight: 2.596 lb.). Similar instances are given in their fig. 4. As an example may be taken a turtle that according to its position in the graph must have had a carapace length of about 20¼ inches; applying the formula given by Carr & Caldwell, the weight of this turtle should have been about 35.7 lb., but the graph indicates a weight of about 51 lb. As Mowbray & Caldwell's Bermuda turtle had the carapace wider than long, Carr & Caldwell's formula does not apply. It is true that it is not known whether the carapace was wider than long when the specimen was captured, and if not, at what stage the width surpassed the length, but there is also nothing to indicate that in 1949 the carapace was longer than wide. Judging by the general trend of the length-weight relationship in the few turtles indicated in Carr & Caldwell's fig. 4 of which the width of the carapace exceeds the length, the carapace of the Bermuda turtle may have been between 12 and 12½ inches (305-317.5 mm) long. Thus, the growth in eight years and three and a half months may just as well have been 165 mm as the 114 mm suggested by Mowbray & Caldwell. Moreover, it seems unlikely that the growth of this turtle is close to the normal rate. At the rate of growth estimated for this Bermuda turtle, it would take at least another three or four years before it would reach sexual maturity.

4) Carr (1955: 150; 1956, 1963*a*: 17) refers to a four-inch specimen from England; this must be a slip of the pen, for the smallest British specimen is one from Wales (see Le 3, Le 4), having a carapace length of 210 mm, i.e., about 8¾ in.; with the four-inch specimen that from Corvo, Azores, may have been meant.

Estimating its age at capture to have been between one and two years, this would imply that Kemp's Ridley would reach maturity not before being twelve or thirteen years old. This does not agree with the estimate for the age at maturity for other turtles (e.g., by Hendrickson, 1958: 529, fig. 15 for the Green Turtle). That a growth of 114 mm in eight years and four and a half months will not be like the normal rate of growth follows from other observations on the growth of captive Kemp's Ridelys. Caldwell (1962 *b*: 6) mentions a young Kemp's Ridley, which when captured had a carapace length of 260 mm, and which after 316 days had increased this length by 45 mm, changing from wider than long to longer than wide. A second specimen, with a carapace length of 279 mm grew 15 mm in 330 days, and after that 46 mm in the next year. Thus, the last-named specimen in just under two years showed an increase of 61 mm, and this is more than half the increase the Bermuda turtle was said to have had in over eight years. I have dwelt at some length on this matter, because it shows how very little we know about the growth of turtles, and how sorely we are in need of accurate information on this subject.

Age. With the very scanty information upon the growth in Kemp's Ridley it is impossible to make an estimate of the age of the specimens found in European Atlantic waters that is in any way reliable. Still the same reasoning as used for the Loggerhead (p. 156) may be applied. From Anonymus (1966 *b*: 2, 16) and from Chávez, Contreras & Hernandez (1967: 21) we learn that nesting takes place from April 21st to July 24th, although tracks of nesting females were still found towards the middle of August. The incubation period varies from 50 to 70 days, for 97.24% of the clutches the incubation period varied from 50 to 57 days (Chávez, Contreras & Hernandez, 1967: 32, table 5). Thus, one may expect hatchlings of Kemp's Ridley to appear from about June 9th at the earliest to about the middle of October at the latest. It is clear that Le 1, taken on October 2nd, 1949, cannot have covered the distance from the Mexican beaches to Scotland in about three months and twenty-four days, let alone in a shorter time, and it follows that this Kemp's Ridley must have hatched not later than in the summer of 1948, or perhaps even in 1947. This would make Le 1 between at least twelve and almost sixteen months old, and perhaps even twenty-four to twenty-eight months old.

The very young specimen found in the Azores shows that some hatchlings do not lose much time before entering upon a voyage across the ocean. In the same way some of the specimens that reach European Atlantic waters will have started on their voyage just after hatching.

Colour. Kemp's Ridley is usually described as being grey (e.g., by Carr, 1942: 4; 1952: 398) and this feature is used in keys as one of the distinctive characters of the species. J. D. Hardy (1962: 217) described a juvenile female from Chesapeake Bay as being grey, mottled with brown, the marginals trimmed with yellow; the flippers are yellowish-brown, the plastron yellow, mottled with reddish brown. For Le 10, from Portreath, Cornwall, I noted that the margin of the carapace was yellowish, the rest of the carapace was brown to blackish, the flippers were yellowish brown. Le 12, from Newlyn Harbour, Cornwall, has the head and fore flippers dull greyish-brown, and the carapace blackish. Le 23, from The Netherlands, is dull brownish in general colour; on its carapace it shows dark greyish transverse streaks on the costals (Brongersma, 1968*h*: fig. 1, Pl. 10); posteriorly the carapace of this specimen shows some irregular whitish areas, but it seems as if these may have been caused by growth of barnacles or algae on the shields; more anteriorly there are also small circular paler spots, where the scutes have been damaged probably by barnacles settling on them.

Food. [Montoya] (1966: 33) states that Kemp's Ridley feeds principally on animals, among which the following occur most frequently: gastropods, crabs, sea urchins, sea stars, medusae, and fish. Again one wonders whether the fish were not entered in the list, because captive specimens eat fish. In none of the accounts on the contents of stomach and intestine have fish remains be mentioned.

De Sola & Abrams (1933: 12; Pope, 1939: 289) mention the stomach contents examined by them to consist of remains of the Spotted Lady Crab (*Palyonichus ocellatus*).

Carr (1942: 10) found remains of the Dolly Varden Crab (*Hepatus epheliticus*) in two specimens from Florida.

Dobie, Ogren & Fitzpatrick (1961: 110) examined the stomach and intestinal contents of two specimens from Louisiana. The stomach of the first contained "a half crab", and in the intestine several male abdominal appendages compatable with those of *Callinectes sapidus* and *C. ornatus* were found; further gastropods of the genus *Nassarius*, a "few twigs, a small fragment of dicot wood, and a leaf resembling the genus *Quercus*". The intestine of the second specimen contained gastropods of the genus *Nassarius*, and clams of the genera *Nuculana*, *Corbula*, and probably of the genus *Mulinia*; moreover, "several mud balls of about two millimeters diameter" were found.

J. D. Hardy (1962: 219) examined the digestive tract of a specimen from Virginia. This contained numerous fragments of crab shell; about 95 per

cent of these fragments had come from crabs of the genus *Callinectes*, and one swimmerette was almost certainly that of the blue Crab, *Callinectes sapidus*; one hard well-worn, heavy-walled cheliped may have come from one of the large mud crabs, either *Panopeus* or *Menippe*.

The stomach and the anterior part of the intestine of Le 23, from The Netherlands, were empty; the scanty contents of the gut of Le 6 consisted of a fragment of a barnacle and some fragments of a bivalve shell, but there is no evidence whether the barnacle and the bivalve were taken as food or whether the fragments were picked up as such from the bottom.

IV. *Chelonia mydas* (L.), Green Turtle

In English this species is also known as the Edible Turtle; Dutch: Soep-schildpad; French: Tortue franche, and sometimes: Tortue verte; German: Suppenschildkröte; Norwegian: Suppeskilpadde; Spanish: Tortuga verde, Tortuga blanca, or Tortuga comestible.

General statements concerning the occurrence of the Green Turtle in European Atlantic waters have been made, inter alia by:

Brehm (1869: 50), Ditmars (1910: 47; 1922: 47; 1936: 302), Werner (1912, 1920: 454), Wermuth (1957: 80), Villiers (1958: 160), Dottrens (1963: 247), Peters (1967: 383): *Chelonia mydas*;

Brehm (1878: 80), Heilprin (1887: 313), Schmiedeknecht (1906: 259): *Chelone viridis*;

Sauvage (1885: 112): *Chelonia viridis*;

Schreiber (1912: 774): *Chelone mydas*;

Mertens & Müller (1928: 23; 1940: 22), Mertens & Wermuth (1960: 70), Fuhn & Vancea (1961: 179): *Chelonia mydas mydas*.

Moreover, there are a number of more or less general statements in literature with regard to the occurrence of the Green Turtle on the coasts of various European countries (see below in the list of records).

IV A. List of records of *Chelonia mydas* (L.)

GREAT BRITAIN

The following authors mention the Green Turtle to reach British waters:

Schreiber (1875: 518), Heilprin (1887: 313): *Chelone viridis*;

Voigt (1837: 85), Kollar, Fitzinger & Heckel (1853: 67), F. Smith (1898-99: 23), M. [A.] Sm[ith] [&] A. d'A. B[ellairs] (1967: 312): *Chelonia mydas*;

Schreiber (1912: 770): *Chelone mydas*;

M. [A.] Sm[ith] (1955: 550): Green or Edible Turtle;

A. Hardy (1959, 1964: 259, reported, but never confirmed): *Chelonia mydas*.

The species had not been recorded from Great Britain in Fleming's time, but this author believed that the species may "be yet enumerated among our accidental visitants" (Fleming, 1828, 1842: 150: *Chelona mydas*).

Hume (1955: 86, Green Turtle) states: "Stray individuals . . . have been reported off the coasts of the British Isles, although such reports lack confirmation."

Fraser & H. W. Parker (1949, 1953: 39, *Chelonia mydas*), and M. A. Smith (1951, 1954, 1964, 1969: 265, *Chelonia mydas*) state that there are no authentic records from Britain. Matthews (1952: 49, *Chelone mydas*) writes that the species is "not known to have reached this country unaided by man."

H. W. Parker (1939b: 129, Green Turtle), Mertens (1952: 28, *Chelonia mydas*; 1960b, 1964, 1968a: 28, *Chelonia mydas mydas*), and Leutscher (1966: 78: *Chelonia mydas mydas*) state that the species has not been found in Britain.

Cm 1, 1887 or 1888, Chesil Beach (Dorset).

Richardson (1889: 170), Cambridge (1894: 92, note): *Chelonia viridis*.

Richardson (l.c.) in his notes on fish from Chesil Beach, writes: "In conclusion I may mention that a green turtle (*Chelonia viridis*) was found floating in the West Bay near Chesil Beach by some fishermen. It was dead, and appeared to have been so for some little time. Most probably it was conveyed by a ship into British waters, but died before reaching land, and was thrown overboard." Cambridge (l.c.) refers to the same turtle: "I am told by our Secretary, Mr. Richardson, that in 1887 or 1888 a specimen of *Chelonia viridis*, the green or edible Turtle, was found dead in the West Bay . . . The shell of this is in our Museum . . .".

Miss E. M. Samuel kindly informed me that the shell is no longer in the Dorset County Museum, and thus the identification could not be checked.

Cm 2, a few days before Christmas, 1875, dead, Channel.

Bowerbank (1876): Edible Turtle.

"A few days before Christmas Day the Hastings fishermen found, floating in the British Channel, a large edible turtle, dead but in quite a fresh condition" (Bowerbank, l.c.). It was a female, and more than a quart of eggs were found in it. The carapace, 41½ inches (1054 mm) long, and 36 inches (914.5 mm) wide, was preserved by Bowerbank.

EIRE

The Green Turtle has been mentioned from Eire in a press report, and on this basis it was recorded by Taylor (1963: chart 8, *Chelonia mydas*), and by Brongersma (1964: 26, *Chelonia mydas*). As shown above (De 63) the specimen in fact was a Leathery Turtle.

THE NETHERLANDS

The species has been mentioned from the Netherlands, inter alia, by:

Suckow (1798: 28): *Testudo mydas*.

Maitland (1897: 16), Van Kampen & Heimans (1927: 51), Mertens (1938: 2; 1952: 28), IJsseling & Scheygrond (1948: 65; 1952: 67; 1957: 67; 1962: 77), Brongersma (1937: 651; 1953: 469; 1963: 250), Pasteur & Bons (1960: 99): *Chelonia mydas*.

Van den Brink (1943: 16), Hellmich (1956: 87; 1962: 83), Mertens (1960b, 1964, 1968a: 28), Leutscher (1966: 78): *Chelonia mydas mydas*.

Cm 3, ii.1934, dead, beach at Callantsoog.

Strijbos (1934): *Chelone mydas*.

Brongersma (1961: 36; 1964: 25, note): *Chelonia mydas*.

The specimen had initials carved into its plastron, such as is done by fishermen in the Caribbean area (cf. Carr, 1963a, plate opposite p. 47, lower figure). Its flippers were perforated. Strijbos (l.c.) concluded that the specimen derived from a turtle transport, that it had died during the voyage, and had been thrown into the sea.

In my earlier papers I mentioned erroneously that the turtle had been found at Camp, instead of at Callantsoog.

Cm 4, xi.1952, alive, beach near Petten. Zoological Museum, Amsterdam.

Brongersma (1961: 37; 1964: 25; 1966: 52; 1967a: 19): *Chelonia mydas*.

This young turtle (length of carapace 360 mm, or 14 inches 3 lines) came ashore near Petten. It was sent to the Amsterdam Zoological Gardens, but it died on the way, and it was turned over to the Amsterdam Zoological Museum.

On its shell it had some small specimens (greatest diameter 4.3 mm) of the barnacle *Elminius modestus* Darwin. Observations on the growth of *Elminius modestus* in the harbour of Den Helder, taking into account the time of the year, show that these barnacles would be about a month old (P. de Wolf, in litt.). *Elminius modestus* is an Australian species, which settled in European waters some time between 1940 and 1945, and by 1952 it was found on both sides of the Channel, and on both sides of the southern North Sea (Crisp, 1958; Bishop & Crisp, 1958). The infestation of the turtle must have taken place, either in the Channel, or in the North Sea. The age of the barnacles on its shell shows that the turtle must have been living in the area for at least a month, and taking into account the currents in the area, this would be about the time necessary to bring the turtle from the Channel to the place where it stranded.

As mentioned above, the size of turtles shipped to Europe to manufacturers of turtle soup would be at least 30 inches, and this turtle is less than

half that size. Besides, as stated by Mr. J. R. Lusty, shipments of live turtles did not take place after the second world war. These two facts show that this young turtle could not derive from a turtle transport. There is, of course, the possibility, that a sailor took a young turtle home, either hoping to obtain a good price for it in his home port, or just as a souvenir, but that he got fed up with it, and threw it into the sea again. The chance, that this is the explanation of the presence of this turtle on the Dutch coast, seems to me to be very small, and for the time being I believe that this is a case of a Green turtle reaching European Atlantic waters of its own accord.

Cm 5, ii.1934, dead, beach at IJmuiden.

Strijbos (1934): *Chelone mydas*.

Brongersma (1961: 36; 1964: 25, note): *Chelonia mydas*.

The turtle was marked with initials carved into its plastron.

Cm 6, 20.ii.1934, dead, beach near Katwijk.

Strijbos (1934): *Chelone mydas*.

Brongersma (1961: 36; 1964: 25, note): *Chelone mydas*.

The specimen was marked with the initials "AB" carved into its plastron.

Cm 3, 5, 6, were found at about the same time. The three specimens were all marked with initials carved into their plastron, and it seems safe to assume that they came from the same turtle transport. Possibly a fourth specimen (Ucm 2) also derived from this transport.

Cm 7, I.xii.1937, dead, beach at Katwijk. Skeleton in RMNH.

This turtle was marked with the initials "AE" carved into its plastron. A leaden tag, bearing the numbers $\frac{20}{142}$ was attached to its left fore flipper. The oesophagus contained undigested food: vegetable matter with some small mollusks, which at the time were identified by Dr. Ch. G. F. H. Bayer (Leiden) as: *Neritina (Vitta) virginea* (L.) var. *meleagris* (Lm.), *Nassa (Phrontis) antillarum* Phil. f. *minor*, *Brachydontis citrinus* (Bolten), *Cerithium* sp. (related to *variabile* Ads.), *Lucina* sp.

Like Cm 3, 5, 6, this turtle apparently was jettisoned from a ship bringing turtles to Europe. The undigested food shows that the animal was transported dry.

Cm 8, Cm 9, Cm 10, vii.1889, one of which was alive, Westkapelle, island of Walcheren.

Weber (1890): *Chelonia midas*.

Van Lidth de Jeude (1895a: 212): three Chelonidae.

Weber (l.c.) writes that an American ship coming from Antwerp threw into the sea several turtles, and apparently the one he examined, as well as several others that stranded at Westkapelle, derived from this lot.

Van Lidth de Jeude (l.c.) stated: "Dr. de Man in Middelburg kindly informs me, that in 1889 he got possession of two specimens of a number of three Chelonidae, cast on shore in our province of Zeeland, one of them still living when it was captured. After many accurate informations Dr. de Man discovered that, not long before that time, from a ship that brought animals from America to the Zoological garden at Antwerp, three marine turtles, being nearly dead, were thrown overboard."

Cm 11, date?, dead, Bruine Bank (ca. 52°35'N, 03°30'E), North Sea. RMNH 14915, left hypoplastron, received 8.viii.1968.

Mr. G. Kortenbout van der Sluys presented to the Leiden Museum a plastral bone of a turtle, which had been dredged from the Bruine Bank ('Brown Bank') in the North Sea (probably in the beginning of 1968). Comparison with the skeletons of the various species of turtle and with the descriptions and figures published by Młynarski (1961) showed this bone to be the left hypoplastron of *Chelonia mydas*. Although the bone is fairly well preserved its general appearance suggests that it may have been lying on the sea floor for a number of years. It is impossible to say of course, whether the bone derived from a Green Turtle that reached the North Sea on its own, or that it belonged to a dead specimen that had been jettisoned.

BELGIUM

The occurrence of the Green Turtle on the Belgian coast has been mentioned by:

Maitland (1897: 16): *Chelonia mydas*.

De Witte (1948: 230), Hellmich (1956: 87; 1962: 83), Leutscher (1966: 78): *Chelonia mydas mydas*.

Cm 12, 25.ii.1903, Lillo-Port, Antwerp. IRSN: IG 6927, Reg. 1573.

The label states "trouvée en chair", and from this one might conclude that it was dead when found, otherwise the label would have mentioned its having been found alive. The turtle was not marked in any way, but its having been found in the harbour makes it likely that it was thrown into the water from a ship.

Cm 13, 24.viii.1935, beach of Knocke-Zoute, opposite the Royal villa. Presented by H. M. King Leopold III, IRSN: IG 10613, Reg. 1453.

The incomplete skeleton has been preserved; the skull is lacking. This

turtle, like those found on the Dutch coast in 1934 and 1937, may well have been jettisoned from a ship.

Cm 14, v?1854, North Sea, not far from the Belgian coast.

De Selys-Longchamps (1854: 1048), Van Beneden (1859: 71): *Chelonia midas*.

See also, discussion below, under Cm 15.

Cm 15, vi?1856, stranded at Klemskerke, near Ostend.

Hartwig (1859: 164), Van Beneden (1859: 71): *Chelonia midas*.

Strauch (1865: 143): *Chelonia viridis*.

Mertens (1926: 12): *Caretta caretta*.

Mertens (1938: 2; 1952: 28): *Chelonia mydas*.

Mertens (1960b, 1964: 28): *Chelonia mydas mydas*.

The record for *Caretta caretta* from Ostend by Mertens (1926: 12) is apparently based on this and perhaps also on the preceding specimen (Cm 14), and the use of the name *Caretta caretta* obviously is a lapsus calami. Wraxall (1860: 86: *Sphargis coriacea*) after having mentioned a Leathery Turtle taken on the French Mediterranean coast (1778) adds that another was found at Ostend in 1856. It is not clear whether it was his intention to identify the Ostend turtle as a Leathery Turtle, or that he just meant 'another turtle'.

These two specimens (Cm 14 and Cm 15) may be discussed together. In the notes appended to a paper on the Belgian Fauna, read at the meeting of the Royal Belgian Academy of Sciences, Letters, and Arts, of December 17th, 1854, De Selys-Longchamps (1854: 1048, 1049) mentions having been informed by Van Beneden about the capture in the current year of a Green Turtle in the North Sea not far from the Belgian coast. Hartwig (1859: 164) mentions a Green Turtle, weighing several hundreds of pounds, to have stranded in the neighbourhood of Ostend.

In a paper on epizoans and parasites of "*Chelonia midas*", Van Beneden (1859: 71) mentions two Green Turtles, which, with a few years interval, were captured alive by fishermen from Ostend, one in May, the other in November (year not indicated). Both were said to have been taken not far from the Belgian coast. Somewhat in contradiction to this, Van Beneden (1859: 71) in another paragraph states that the November specimen was cast ashore on the beach at Klemskerke⁵). Combining this information with

5) According to Van Beneden, Klemskerke is situated one mile to the west of Ostend, but on the maps I have consulted this village is situated about 5 to 6 km East by North of Ostend, and about 2.8 km from the sea.

that given by De Selys-Longchamps (1854: 1049) and by Hartwig (1859: 164) it would appear that the 1854 turtle was taken in May, and that the 1856 turtle stranded in November.

None of the authors mentions any characters that would definitely identify these turtles as Green Turtles. Of the specimens from Klemskerke (Cm 15), Van Beneden (1859: 71) indicates that the stomach and intestine contained opercula of *Buccinum undatum*, and of legs of hermit crabs. On p. 192 I have given references to authors, who mention Crustacea and Mollusks as being occasionally taken by Green Turtles. However, Mollusks and Crustacea appear also in the normal diet of *Caretta caretta*, and it seemed worth while to check whether Van Beneden really had examined two Green Turtles, and whether not one of them or both had been Loggerheads. In this I was not very successful.

The Institut Royal des Sciences Naturelles de Belgique, Brussels, possesses a skeleton of *Chelonia mydas* (IG 2446, Reg. 215), with a label: "Côtes de Belgique", which was purchased of Van Beneden, on October 15th, 1861. There is no further indication of the place and date of capture. Although there is no absolute proof of this, it may well be one of the two turtles mentioned by Van Beneden (1859: 71).

Van Beneden (1859: 71) states that the two turtles were sent to him to Louvain, where he was attached to the Roman Catholic University. In the Zoological Institute at Louvain a number of turtles were examined by me, without definite results, however. The town and the institute have suffered badly from two world wars, and it is no wonder that a number of labels were lost. There was no Green Turtle that could have been Van Beneden's second specimen, but there was one old skeleton of a Loggerhead (with the skull of a Green Turtle attached to it). It was not possible to check whether this skeleton, or perhaps the skull belonged to one of the turtles examined by Van Beneden. Thus, the question whether he really examined two Green Turtles must be left unanswered.

FRANCE

Information about the occurrence of the Green Turtle in French Atlantic waters is scarce. Suckow (1798: 28, *Testudo mydas*) states that it has been taken on the French coast, and according to Kollar, Fitzinger & Heckel (1853: 67, *Chelonia mydas*) the Green Turtle is often captured on the French and English coasts. There are no recent records from France, and Angel (1946) does not include the species in his survey of French reptiles.

Little value can be attached to some of the old records, because they are based upon misidentified specimens (see De 76, De 124). C[loquet] (1817:

372-373, *Chelonia mydas*) states that the Green Turtle has sometimes been found near the Loire estuary, but no value can be attached to this statement, for Cloquet was one of the authors that referred the Leathery Turtle of Dieppe (De 76) to the Green Turtle. This author also states that in the last years he had seen two or three small specimens (of the Green Turtle), which came from Dieppe; this more or less doubtful record I have placed with the unidentified turtles (Un 48, Un 49).

Cm 16, off Le Havre (Seine-Maritime). Muséum d'Histoire Naturelle, Rouen.

I have seen this specimen, and with two prefrontals and four pairs of costal shields it is undoubtedly a Green Turtle. The date of capture is unknown. The specimen being placed in a kind of diorama, it could not be measured.

Cm 17, Charente-Maritime. Muséum Fleuriat, La Rochelle.

Beltrémieux (1864: 4, 37; 1884: 471): *Chelonia mydas*.

In the first paper, Beltrémieux (1864: 4) mentions the Green Turtle (and the Loggerhead) to be rare; only some specimens had been observed. In the same paper (1864: 37), and in the second paper (1884: 471), Beltrémieux states that the species is rare, but that several specimens have been taken in La Rochelle Roads, driven to the coast by gales.

The Muséum Fleuriat, La Rochelle, possesses one stuffed Green Turtle, labelled "Charente-Maritime"; no date is mentioned on the label, and it is not known when it has been acquired. By the look of it, the specimen is from a fairly old collection, and it may date from the time of Beltrémieux. The carapace is 610 mm long.

Cm 18, coasts of Gironde. Muséum d'Histoire Naturelle, Bordeaux.

Lataste (1876: 224): Chélonée franche.

In his paper on the herpetological fauna of the Gironde, Lataste (l.c.) states that the Green Turtle (as well as the Loggerhead and Leathery Turtle) have been captured on the coast of the Gironde department, and he adds that the Green Turtle and the Loggerhead are to be seen in the Bordeaux Museum.

The Bordeaux Museum possesses one stuffed, young Green Turtle, labelled "Côtes de la Gironde". No information when or where exactly it was taken. It may be the specimen (or one of the specimens) known to Lataste.

This museum also possesses two larger specimens, labelled "Atlantique", but as mentioned in the discussion of the Loggerheads, which are labelled in

the same way (see Ca 75) there is no proof that these are from the French Atlantic coast.

SPAIN

Boscá (1881b: 111, *Chelonia viridis*) mentions the Green Turtle as an accidental visitor to the Atlantic and Mediterranean coasts of the Iberian Peninsula. Graells (1870: 299) states that no turtles were seen by him during his stay in Galicia, neither in the rias nor in the open sea, and that he did not receive any information about them. However, Lopez Seoane (1865: 44) states that at long intervals the Green Turtle has been found in the ria de Vigo, and in the ría de Arosa. In a later paper, Lopez Seoane (1877: 350; repr.: 2) writes of this species: lives in the rías of Vigo and Arosa, where it uses to appear on rare occasions, and even in that of Pontevedra. Still later, the same author (Lopez Seoane, 1884: 19) states that the Green Turtle occurs accidentally and rarely in the same localities as the preceding species mentioned by him (i.e., the Loggerhead); of that species it is stated that it is rare on the Cantabrian Coast, and in the rías of Pontevedra, Vigo, and Arosa. On these reports, the records Cm 19, 21, and 22 are based. As the possible occurrence of the Green Turtle on the Cantabrian Coast has not been specifically mentioned in the other papers by Lopez Seoane, I have not included it as a separate record.

No specimens having been preserved, the records Cm 19, 21, 22, cannot be checked, but they are made more likely, by the capture of a young Green Turtle in the Ría de Arosa, in 1959 (Cm 20).

Cm 19, Ría de Arosa (Prov. La Coruña and Prov. Pontevedra).

Lopez Seoane (1865: 44): *Chelonia midas*.

Lopez Seoane (1877: 350, repr.: 2): *Chelonia mydas*.

Boscá (1881a: 283), Lopez Seoane (1884: 19): *Chelone viridis*.

Cm 20, vii or viii.1959, Ría de Arosa, off Suorrozas beach, about 1 km from Cambados (Prov. Pontevedra). Museo de Zoología Regional, Santiago de Compostela.

Castro (1966: 6): Tortuga verde.

Brongersma (1967a: 19): *Chelonia mydas*.

Green Turtles being extremely rare in European Atlantic waters, it seemed important to have more information about the circumstances in which this specimen was taken. I am greatly indebted to Mr. P. R. Castro, of Villagarcía de Arosa, for making the necessary inquiries.

The turtle was captured by Juan Vidal Santos, of Corbillón, when one day in July or August, 1959, at 4 a.m., he was fishing from a boat with a small

harpoon and acetylene light. The turtle was lying on the bottom, ca. thirty metres from the beach of Suorrozás, about two kilometres along the coast from Cambados in the direction of Villagarcía de Arosa, just beyond Pta. Tragrove. It was harpooned through one of the flippers, and brought to the surface. The fisherman kept it at home for a day or two, and for another two days he kept it in a wire cage hanging in a "viveiro" (large tank to keep a stock of live crustaceans for the trade). After that he gave it to Don Joaquín Gil y Armada, knowing that this gentleman was interested in obtaining rare specimens for Prof. L. Iglesias Iglesias of the Faculty of Science, University of Santiago de Compostela. Don Joaquín brought the turtle alive to Santiago. On the days preceding the capture there had been a storm, and it is believed that the strong current resulting from this carried the turtle to the place where it was found.

The specimen has been examined by me at Santiago de Compostela, and there is no doubt about its being *Chelonia mydas*. It has a single pair of elongate prefrontals, and four costal shields on either side. There are twelve marginals and four inframarginals on either side; a distinct intergular is present.

Carapace, long 362 mm, wide 315 mm.

As in the case of Cm 4, we are dealing with a turtle, which is too small for the trade, and which was captured at a time when shipments of live turtles did no longer take place. Therefore, there is full reason to assume that this Green Turtle reached the Spanish coast on its own accord.

Cm 21, Ría de Pontevedra.

Lopez Seoane (1877: 350, repr.: 2): *Chelonia mydas*.

Boscá (1881a: 283), Lopez Seoane (1884: 19): *Chelone viridis*.

Cm 22, Ría de Vigo (Prov. Pontevedra).

Lopez Seoane (1865: 44): *Chelonia midas*.

Lopez Seoane (1877: 350, repr.: 2): *Chelonia mydas*.

Boscá (1881a: 283), Lopez Seoane (1884: 19): *Chelone viridis*.

Cm 23, coast of Cadiz (Prov. Sevilla).

Machado (1859: 565), Boscá (1877: 45): *Chelonia mydas*.

Boscá (1881a: 283): *Chelone viridis*.

PORTUGAL

The Green Turtle has been mentioned from Portugal by Vandelli (1797: 69, *Testudo mydas*), and by Osório de Castro (1954: 231, *Chelone mydas*). The record by Vandelli may be considered doubtful; in the first place there still was some confusion about the specific characters in Vandelli's time, and in

the second place Vandelli did include a few imported species in his list of Lusitanian animals. Neither Vandelli, nor Osório de Castro mentioned specific localities.

Most authors dealing with the reptiles of Portugal omit the Green Turtle from their list, e.g., Bocage (1863), Boscá (1877, 1881a), Sequeira (1886), Ferreira (1892, 1893), Vieira (1896), Ferreira & Seabra (1911), Nobre (1935), Ladeiro (1956), Pissarro (1958).

Boscá (1881b: 111; *Chelonea viridis*) mentions the Green Turtle as occurring on the Atlantic coast of the Iberian Peninsula, but Portugal is not specifically mentioned. Probably his remarks are based upon the Spanish records Cm 19, 21, 22.

Oliveira (1896: 29, *Chelone viridis*) is of the opinion that the Green Turtle might be found on the Portuguese Coast. The recent capture of a live Green Turtle (Cm 20) on the Galician Coast of Spain, makes it likely that this species will also be found, be it very rarely, in Portugal.

IV B. List of records of unidentified turtles, which probably were *Chelonia mydas* (L.).

GREAT BRITAIN

SCOTLAND

Ucm 1, 4.i.1956, dead, beach at Meal, Burra Isle (Shetland).

Editors (1956: 175), Stephen, Rae & Lamont (1963: 38): no identification.

H. W. Parker (1956b: 175-176), Brongersma (1967a: 19): probably a Green Turtle.

When found on the beach, the turtle was in a bad state. The head and neck, as well as part of the carapace were lacking. "It was estimated by local observers to measure about 6 feet from tip to tip of flippers, to be 3 feet in length and to weigh about 1½ cwt" (Editors, 1956).

Only a fragment of the shell was saved, and this (together with some photographs) was sent to Dr. H. W. Parker, British Museum (Natural History), London, who arrived at the conclusion that it was probably a Green Turtle (H. W. Parker, 1956b: 175, "probable rather than certain").

If this turtle had been found in the time of shipments of live turtles, I would have assumed that it had been jettisoned after it had died, but this would not explain the loss of the head, nor the lack of part of the carapace. The four Green Turtles, found dead on the Dutch coast (Cm 3, 5, 6, 7), and which obviously were jettisoned, all were complete. Now that this turtle was found at a time, that shipments of live turtles do not longer take place, it may be that this is another example of a Green Turtle crossing the Atlantic Ocean by its own effort, but in this instance the turtle did not survive its voyage.

The turtle may have been killed (or damaged post mortem) by a ship's propeller.

THE NETHERLANDS

Ucm 2, 21.ii.1934, Goeree.

The "Nieuwe Rotterdamsche Courant" (Sheet B) of February 22nd, 1934, mentions a turtle weighing 50 kg (110 lb), which was brought to the Rotterdam fish market by a skipper from Goeree. The next day this turtle was mentioned in the "Haagsche Courant" (23.ii.1934), but by that time the weight had been increased to 75 kg (165 lb.)! The turtle was preserved, and it was placed on display in the main hall of the fish market until 1954. By then its condition had deteriorated so much, that it had to be destroyed (Mr. P. Rijke, Rotterdam, personal communication). No further information could be obtained, as the archives of the fish market were destroyed when Rotterdam was bombed in 1940.

At about the same time, the carcasses of three Green Turtles (Cm 3, 5, 6), obviously jettisoned from a ship, were washed ashore at other points on the Dutch coast. I feel safe in assuming that the Goeree turtle also was a Green Turtle, jettisoned from the same ship.

IV C. *Chelonia mydas* (L.). Discussion

From the large number of references it would seem that the Green Turtle must be very common in European Atlantic waters, but the opposite is the case. Not only, the species is rare, and specified records are few, but it often has been doubted whether any Green Turtle ever succeeded in reaching European Atlantic waters, otherwise than by human agency. The editor of the 1840 edition of Oliver Goldsmith's "A History of the Earth and Animated Nature" was of the opinion that the records of the Green Turtle from the French Atlantic coast might have been based upon wrongly identified Loggerheads (Goldsmith, 1840, 1862: 342, note; n.d. b, c: 317, note 2), and I believe this has been the case with a 'Green Turtle' recorded from Mount's Bay, Cornwall, in 1874 (see: Uca 2). Also at one time or another, Leathery Turtles from France have been referred to as having been Green Turtles (see De 63, De 76, De 124).

The Green Turtle is highly esteemed as food, be it that the meat is eaten, or that the animal is used in preparing turtle soup. It has been in demand in Europe for a long time, and for centuries turtles have been shipped to Europe. Two items in the Gentlemen's Magazine, 1753, show this; on p. 441 it is stated: "Friday August 31. A Turtle weighing 350 lb. was eat at the *King's Arms* tavern Pall Mall, the mouth of an oven was taken down to admit the part to be bak'd", and on p. 489: "The *Turtler*, capt. Crayton lately arrived from the island of Ascension has brought several turtles of above

300 lb. weight, which have been sold at very high prices (It may be noted that what is common in the *West Indies* is luxury here)." Whilst shipments of turtles were rare two centuries ago, they became much more common later, in fact so common that special mention of them is no longer made in newspapers.

Not all turtles shipped to Europe reached the kitchens where they were to be made into soup. Some ships were wrecked, and the turtles got a chance to escape. Laborie (in: Valmont de Bomare, 1771: 50; 1775*a*: 226; 1775*b*: 55; 1776: 50; Valmont-Bomare, 1800: 265) mentions a turtle that his father took home alive from San Domingo, in 1741 or 1742, and which escaped when the ship was wrecked on the French coast at the mouth of the river Morbier (Laborie's hypothesis that this turtle was recaptured in 1754 has been dealt with under De 124). Cornish (1874*a*: 4242) mentions a ship carrying turtles having been lost in Mount's Bay, Cornwall, in the winter of 1871-1872, and of which two live turtles were saved. Sometimes turtles, which were brought to Europe by ship, were thrown into the sea for one reason or another. In July 1889 several turtles were thrown into the Scheldt by a ship putting out to sea from Antwerp (Cm 8-10). Chapman (1866: 56), writing from Teignmouth, refers to turtles being thrown into the water "sometimes by accident, sometimes wilfully." He mentions a turtle weighing 80 lb., which "was allowed to get away from our beach", and also a shipment of turtles "not worth twopence", which were about the town for a long time until they had half bitten off the fingers of several children, and then they were thrown into the harbour. Although turtles are hardy animals, some of those shipped to Europe will have died during the voyage, and their carcasses will have been flung into the sea; a few of these were washed ashore on our coasts (e.g., Cm 3, 5, 6, 7). Alexander (1837: 300; Simmonds, 1859: 180; Parsons, 1962: 16) mentions a shipment of two hundred turtles of which only four arrived alive at the port of destination. Hornell (1927: 45-46) refers to the transportation of live Green Turtles from Jamaica to London. In the old times shipments of "330 odd head of live turtle" were brought to England in a sailing brig. The turtles were kept in tanks with sea water and they were fed every other day with turtle grass. Although the voyage often took forty or more days only forty to fifty turtles died (Lambert, 1909: 200). Later, turtles were shipped in steamers, on their backs and except that they were protected by an awning and had water sprinkled over them periodically, they received no attention. The mortality was often very serious, and it was not infrequent that 50 per cent of the turtles shipped in this way died during the voyage (Hornell, 1927: 46).

Without any doubt a number of records of Green Turtles found on Euro-

pean Atlantic coasts must be explained by assuming that they were brought to the area by ship, and that they either escaped, or were thrown into the sea, alive or dead. It has been customary to explain all records in this way, and two arguments were used: 1, the regular shipments of live turtles to Europe; 2, the herbivorous diet of the Green Turtle, which would prevent it crossing the ocean. Until recently, I have also held the opinion that Green Turtles could not cross the ocean, but after reconsidering the case of a young Green Turtle, which stranded alive on the Dutch coast, at Petten, in November 1952 (Cm 4), and the record of a Green Turtle (Cm 20) captured alive in the Ría de Arosa, Spain, in 1959, I arrived at the conclusion that occasionally Green Turtles may succeed in crossing the ocean on their own. The two arguments (shipments, diet) may be dealt with here, because they have a general bearing on the problem; arguments with regard to the special case have been mentioned under Cm 4.

1. Shipments of turtles.

Mr. R. J. Lusty, of John Lusty Ltd., Turtle Merchants, of London, kindly informed me that shipments of live turtles were received before the second world war, but that to the best of his knowledge "no live turtles are imported in Europe these days, but all are humanely slaughtered and frozen at the port of dispatch." None of the turtles imported by manufacturers of soup would weigh less than 100 lb, and they would at least be about 30 inches long. Hume (1955: 88) also stated that the "Lord Mayor's Turtle" used to be sent alive to London, but that nowadays it is shipped frozen.

This information is of importance when dealing with records of Green Turtles found since the second world war. The fact that turtles of at least 30 inches long were used, is of importance when dealing with records of young specimens, like Cm 4, which measured slightly over 14 inches.

2. Diet

In a discussion on the species of turtles found in British waters, H. W. Parker (1939*b*: 129) points out that "all the turtles which have been recorded from the British coast (Luth, Hawksbill, Atlantic and Kemp's loggerheads) are carnivorous. The Green Turtle, which is largely herbivorous and would be unable to find food during an ocean crossing, is the only one of the turtles inhabiting the western Atlantic which has not been found on our coast."

Indeed, it is usually stressed in literature that Green Turtles are herbivorous. Thus, Gadow (1901: 381) writes that they are "strictly vegetable feeders", and H. W. Parker (1956*b*: 176) states them to be "exclusively herbivorous". Other statements, however, are less pertinent, e.g., that by H. W. Parker

(1939b: 129): "largely herbivorous", and that by Fraser & H. W. Parker (1949, 1953: 39): "principally herbivorous". Mertens (1952, 1960b, 1964, 1968a: 28) states that Green Turtles also feed on marine plants, especially the old specimens. There are various references in literature to Green Turtles taking animal food as well. It is known that newly-born Green Turtles are carnivorous, but it is not known how long they keep to this diet. About the food of Green Turtles, Deraniyagala (1939c: 234) writes: "Omnivorous, but essentially vegetarian The turtle in captivity feeds readily on meat and fish, and evinces a decided preference for an animal diet." Carr (1952: 352) states: "The adult green turtle is mainly herbivorous in diet, subsisting largely on the marine grasses of the genera *Thalassia* and *Zostera*, which form unbroken carpets of herbage on appropriate flats. The turtles also eat algae and other vegetation and are not averse to stuffing themselves occasionally (at least) on jellyfish, mollusks, or crustaceans. Captive turtles in crawls are usually fed on fish, which they eat without hesitation." Van Bruggen (1965: 189) mentions a Green Turtle, kept in the Port Elizabeth Aquarium, which fed on mollusks (*Solen capensis* Fisch.), and which took fish regularly; other Green Turtles fed on fish, but did not take seaweeds or cabbages, but sometimes they grazed on the green algae on the walls of the tank. This author adds: "In my opinion it is rather doubtful whether these reptiles are true vegetarians; very probably they are omnivorous with a preference for plants if available." Of the Green Turtles captured near the Isla de Mujeres, Mexico, it is said that the meat is less tasty, because they feed on sponges (Carr, 1963a: 230). Hornell (1927: 40) wrote: "on the pearl-banks of Ceylon, whenever beds of young oysters are present, of an age of under three months, the Green Turtle is to be counted among the agencies actively engaged in reducing their numbers. Under three months old, the shells of young pearl oysters are thin enough to cause no inconvenience to predatory animals, and abundance of such tasty food tempts the Green Turtle to vary its diet." Pope (1939: 268) also remarks that "Young oysters are sometimes eaten."

Beebe (1937: 654) described the stomach contents of a Green Turtle, captured near Clarion Island, Pacific Ocean, as follows: "Yet this single specimen which we examined had the stomach crammed with more than four hundred delicate, transparent, gelatinous firolas, or shell-less flying snails, as innutritious a food to our minds as could be imagined. In addition there were twenty-eight Munidas or scarlet lobsterettes as we might call them."

Cadenat (1957b: 1371) examined the stomach contents of two Green Turtles taken at Joal, Senegal. In one of these the stomach was wholly filled with red algae and green algae. The stomach contents of the other specimen consisted for about 25 per cent of red algae and green algae (but no trace

of sea-grass), and for about 75 per cent of remains of Tunicates (*Botryllus*).

The various statements mentioned above do show that the Green Turtle is not as strictly herbivorous as has been suggested by many authors. Although it may have a preference for vegetable food (sea-grass and algae) when available, it takes also animal food when it can obtain this, and it may well be that it can survive in the open ocean if sufficient animal food is available.

It will be of great interest to examine and place on record the stomach contents of individual Green Turtles, both of specimens captured at the turtle-grass pastures and of those captured at sea away from these pastures. In this way more accurate information about the feeding habits would be obtained. That Green Turtles can cross stretches of open ocean is shown by those that migrate from the Brazilian coast to the island of Ascension to breed there, and one would like to know whether these turtles take any food (and if so, what kind of food) on their trip of about 1200 nautical miles.

Although no absolute proof can be given that any of the Green Turtles, which have been found on European Atlantic shores, really did get there by its own effort, it would not be correct to state that crossing the Atlantic Ocean is impossible to them. If it is a well-fed turtle that starts upon the trip across the ocean, it will have a reserve of fat, and this together with the food it may find on its way, may be sufficient to bring the turtle to European waters alive.

The number of records from European Atlantic waters are few, and as has been stated above, some of them can only be explained by their having been brought to the area by human agency. Others have been recorded long ago, and there is no possibility to check the identification, because the specimens are no longer extant, nor is it possible to check the circumstances under which the turtles were taken. Some specimens may have been misidentified at the time, as is shown by the specimens which have been reported as Green Turtles, but which, in my opinion, are without any doubt *Dermochelys coriacea* (see De 76, De 124). However, it must be borne in mind, that if Green Turtles are very scarce in European Atlantic waters to-day, this does not imply that they must have been equally scarce in the past. The uncontrolled collecting of eggs for human consumption has greatly depleted the stock in many parts of the world. Green Turtles have become scarce in the northern part of the Caribbean area, about the Bahama Islands, and on the east coast of Florida, where once they were plentiful. It is probably from this area that turtles, crossing to European Atlantic waters, would come. In the past, with larger numbers of Green Turtles available, the chances were greater, that occasionally one would cross to Europe. Therefore, I do not rule out the possibility, that some of the records from the past century were based upon

Green Turtles that crossed the Atlantic Ocean by their own effort, just as I believe that the turtles (Cm 4, Cm 20), found in European Atlantic waters after the shipment of live turtles had stopped, reached our shores on their own accord.

V. *Eretmochelys imbricata* (L.), Hawksbill (Turtle).

Dutch: Echte Karetschildpad; French: Tortue caret, Tortue bec-à-faucon, la Tuilée (obsolete), Chélonée caret (obsolete). German: Echte Karettschildkröte; Norwegian: Ekte karett; Spanish: Tortuga Carey.

Whether the Hawksbill ever succeeded in crossing the Atlantic Ocean of its own accord is still open to doubt. As yet, I have examined only one specimen from European Atlantic waters, which really was a Hawksbill (Er 1). It is stated to have been found in the Channel, but the circumstances under which it was taken (e.g., alive or dead) are unknown, and this reduces the value of the record.

Stephen (1953: 3) is of the opinion that the records of the Hawksbill are suspect, and with this I fully concur. Of twenty British records that at one stage or another were ascribed to the Hawksbill, eight records have been checked, and in five instances the specimens were shown to be Loggerheads (*Caretta caretta*): Ca 11, Greenside, 1861; Ca 12, Pennan, 1861; Ca 28, Porthleven, 1953; Ca 30, Isle of Wight, 1899; Ca 39, Jersey, 1950; three records proved to have been based upon Kemp's Ridley (*Lepidochelys kempii*): Le 3, Mochras Island, 1930; Le 6, Woolacombe Beach, 1967; Le 15, Jersey, 1938. The twelve remaining British records, and three French records could not be checked, because the specimens were not preserved, or because they are no longer extant. These unchecked records I consider extremely doubtful, and probably most, if not all of them will have been based on *Caretta caretta* and *Lepidochelys kempii*.

However, as other species can (and do) cross the Atlantic Ocean, there is no reason to believe that the Hawksbill would be unable to do so. In this connection we must remember that the Hawksbill (like the Green Turtle) is a species which prefers warmer seas than the Loggerhead does, and that, therefore, it usually remains in more southern areas. Moreover, due to persistent persecution in the past, the Hawksbill population has become much reduced, and this makes the chances much smaller that a Hawksbill will wander into the open ocean and that it will cross to Europe. All we can say at present is that the possibility of the Hawksbill reaching European Atlantic waters is not to be excluded. If it were known that the Channel specimen (Er 1) had been taken alive, this would have been valuable evidence, but as yet definite proof of the Hawksbill reaching our waters by its own efforts is lacking.

General statements about the occurrence of the Hawksbill in European Atlantic waters have been made, inter alia, by:

- Brehm (1869: 50): *Chelonia-Eretmochelys-imbricata*;
 Lataste (1876: 224): Chélonée caret;
 Heilprin (1887: 313): *Chelone imbricata*;
 Mertens & Müller (1928: 23; 1940: 21), Carr (1952: 366), Mertens & Wermuth (1960: 71): *Eretmochelys imbricata imbricata*;
 Dottrens (1963: 247): *Eretmochelys imbricata*.

Its occasional occurrence in the North Sea is mentioned by:

- Mertens (1952: 28): *Eretmochelys imbricata*;
 Hellmich (1956: 87; 1962: 83), Carr & Goin (1959: 248), Mertens (1960b, 1964; 1968a: 28), Leutscher (1966: 74): *Eretmochelys imbricata imbricata*.

From British waters, the species has been mentioned by:

- Th. Bell (1838, 1849: 1), Anonymus (1845: 47), Knight (1858: 79), Bath (1892: 2): *Chelonia imbricata*;
 Figuier (1869: 179): Hawk's bill Tortoise;
 Figuier (1892: 164), "The Times" (16.i.1939: 9, col. 4), H. W. Parker (1939b: 129; 1946): Hawksbill;
 Flower (1933: 750), H. W. Parker (1935: 37), Fraser & H. W. Parker (1949, 1953: 38), M. A. Smith (1951, 1954, 1964, 1969: 265, 266), Matthews (1952: 49), Mertens (1952: 28), M. [A.] Sm[ith] [&] A. d'A. B[ellairs] (1967: 312): *Eretmochelys imbricata*;
 Noël-Hume (1954: 103): Hawksbill Turtle;
 Hellmich (1956: 87; 1962: 83), Mertens (1960b, 1964, 1968a: 28), Leutscher (1966: 74): *Eretmochelys imbricata imbricata*;
 M. A. Sm[ith] (1955: 550): Hawksbill Turtle.

That the species might be found on the coast of Gironde, France, is mentioned by Lataste (1876: 224, Chélonée caret). Angel (1946: 177-178, *Eretmochelys imbricata*) does not mention the Hawksbill from the French Atlantic coast; the only French record by this author is from the Mediterranean.

Harvie-Brown & Buckley (1887: 249, and 1888: 171, *Chelone imbricata*) mention the Hawksbill in their survey of the vertebrate fauna of Sutherland, Caithness, and West Cromarty, and in that of the Outer Hebrides, but apparently they had no information on any definite records for those areas (1888: 12).

FRANCE

Er 1, ♀ juv., v. 1953, Channel (La Manche). Musées d'Histoire Naturelle, La Rochelle.

There is no doubt about this specimen being a Hawksbill; it has two pairs of prefrontals, four pairs of costal shields, and the shields of the carapace are distinctly imbricate. Length of carapace 270 mm.

No further data about the exact locality, the circumstances under which it was taken, nor the name of the collector are available. The specimen reached

the La Rochelle Museum at a time the institution had no director, and no one saw the importance of additional documentation, which would have made further enquiries possible. This is to be regretted, because this is the only specimen of the Hawksbill from European Atlantic waters in any museum, and with additional information it would have been more valuable.

VI. TURTLES, WHICH IN LITERATURE, OR IN CORRESPONDENCE WERE RECORDED AS HAVING BEEN HAWKSBILLS, BUT OF WHICH THE IDENTIFICATION (ALMOST) CERTAINLY IS INCORRECT.

GREAT BRITAIN

SCOTLAND

Ue 1, before 1828, Papa Stour (Shetland).

Fleming (1828, 1842: 149): *Chelona imbricata*.

Jenyns (1835: 291), Th. Bell (1838, 1849: 9), Cooke (1865: 174; 1893: 173), Lyell (1868: 365; 1872, 1875: 369), Tudor (1883: 414): *Chelonia imbricata*.

Stephen (1953: 108, 109), Taylor (1963: chart 8): not identified.

Fleming (1828, 1842: 149) writes: "I have credible testimony of its having been taken at Papa Stour, one of the west Zetland islands." There is no evidence at all that the report really was based upon a Hawksbill.

Ue 2, Orkney.

Sibbald (1684: 13; page erroneously numbered 11): Testudo... Marina.

Wallace (1693: 14; 1883: 17): Tortoise.

Sibbald (1697: 193): Testudo marina squamosa.

De La Cépède (1788a: 87; 1788b: 115; 1799: 36), Lacépède (1802a: 150; 1825: 62; 1836: 30; 1839: 133; 1856: 146): Tortue franche.

Bechstein (1800: 103): Riesenschildkröte.

De La Cépède (1802b: 121), Lacépède (1833: 347): Testudo Mydas.

Turton (1807: 78), Th. Bell (1861: 7759): Testudo imbricata.

Fleming (1828, 1842: 149): Chelona imbricata.

Jenyns (1835: 291), Th. Bell (1838, 1849: 9), Cooke (1865: 174; 1893: 173), Lyell (1868: 366; 1872, 1875: 369): Chelonia imbricata.

Voigt (1837: 85): Chelonia Mydas.

Schlegel (1838: 26): probably Chelone cephalo.

Strauch (1865: 146): Thalassochelys corticata.

Buckley & Harvie-Brown (1891: 265): Chelone imbricata.

Guppy (1917: 40): turtle.

Taylor (1948: 10, 26), Fraser & H. W. Parker (1949, 1953: 38), M. A. Smith (1951, 1954, 1964, 1969: fig. 84), Mertens (1952: 24): Eretmochelys imbricata.

Stephen (1953: 108, 109), Taylor (1963: chart 8): not identified.

Mertens (1960b, 1964, 1968a: 24), Leutscher (1966: 74): Eretmochelys imbricata imbricata.

Sibbald (1684: 13) mentions having been informed by a worthy man living in Orkney ("ut à fide digno Viro ibo degente habeo") that live turtles are

sometimes captured there. Probably the Rev. James Wallace was this worthy man; in his "Description of the Isles of Orkney", published after his death, and dedicated to Sibbald, Wallace (1693: 14; 1883: 17) writes: "sometime they find living Tortoises on the shore." Probably it was also the Rev. James Wallace, or his son James Wallace, M.D., who sent a turtle shell to Sibbald. It was mentioned by Sibbald (1697: 193-194) as follows: "*Testudo Marina Squamosa. The Scalie* Sea tortoise; *the Shell of it. The Animal* came into Orkney, *and this was sent to me from thence* . . . and Aurelius Severinus gives some observations upon the Sea-Tortoise and Dr. Grew Mus. R.S."

The reference to Grew is of interest, because Grew (1681: 38, pl. 3) described and figured "A Scaly Tortoise Shell" which undoubtedly is the carapace of a Hawksbill. On the basis of this reference, one might assume that Sibbald's turtle was also a Hawksbill. It is extremely doubtful, however, whether any one of the characters that we, to-day, accept as characteristic of the Hawksbill (e.g., four pairs of costal shields; imbricate shields on the carapace (except in the very young and very old)) were considered of much importance in the seventeenth century. I doubt whether Sibbald (or any contemporary) clearly understood the difference between the Hawksbill and the other species, like the Loggerhead. About sixty years later, Linnaeus (1758) still confused the two species.

The reference to the anatomical notes by Severinus is of no value. From the remarks by Severinus (1645: 320-321) one can only conclude that he dissected a turtle (e.g., by his mentioning the pointed papillae in the oesophagus), but it is not possible to indicate definitely what species he examined. From the fact that Severinus was a professor at Naples, I would say that he probably dissected a Loggerhead.

If one considers Sibbald's reference to Grew as decisive evidence, one has to accept the record as proof that the Hawksbill has been found in Orkney. Various authors have done so (see list of references, above); De La Cépède, Bechstein, and Voigt placed the Orkney record with the Green Turtle, but to this species they also referred specimens of the Leathery Turtle; Schlegel (1838: 26) believed it to be probably a Loggerhead, and Strauch (1865: 146) includes the Orkney record among those of the Loggerhead. Stephen (1953: 108, 109), and Taylor (1963: chart 8) place the Orkney record with those of which the species cannot be identified, and I agree that this is the best course to take, until more definite evidence is obtained.

ENGLAND

Ue 3, spring of 1774, alive, River Severn (Gloucestershire).

Turton (1807: 78): *Testudo imbricata*.

Fleming (1828, 1842: 149): *Chelona imbricata*.

Jenyns (1835: 291), Th. Bell (1838, 1849: 9), Cooke (1865: 174; 1893: 173), J. Jones (1865: 157), Lyell (1868: 366; 1872, 1875: 369), Witchell & Strugnell (1892: 126): *Chelonia imbricata*.

E. Hardy (1947: 18): Hawksbill turtle.

Taylor (1948: 10, 26; 1963: chart 8), M. A. Smith (1951, 1954, 1964, 1969: fig. 84): *Eretmochelys imbricata*.

Turton (1807: 78) mentions a specimen, which was taken in the Severn, in the spring of 1774, and which was "placed in the fish-ponds of the Author's father, where it lived till winter." Turton adds: "Feet fin-like, body ovate, with 13 imbricate plates in the disk, and serrate round the margins", and further: "Body growing to a large size, roundish ovate". Although the Hawksbill may grow to a fair size, I would not describe it as having a "Body growing to a large size". Other species, like the Loggerhead, the Green Turtle, and the Leathery Turtle become distinctly larger than the Hawksbill, and Turton's remark would sooner apply to them. The fact that the shape of the body is described twice ("body ovate", "body roundish ovate") may point to Turton having taken the description from literature, and then from different sources, rather than from the specimen taken in the Severn; he may also have confused two or more species. If the first-mentioned diagnosis, which refers to thirteen imbricate scutes in the disk, was based upon the Severn specimen, there would be no doubt about its having been a Hawksbill. However, it must be remembered that Turton was born on May 21st, 1762 (Woodward, 1899: 377). Thus, when the turtle was captured in the spring of 1774, Turton was not quite, or only just twelve years of age, and it seems unlikely, that he made any notes at the time. The description published over thirty years later (in 1807) can hardly be accepted as conclusive evidence that the Severn specimen really was a Hawksbill.

Moreover, there seems to be some indication that Turton's statements were not always trustworthy. Forbes & Hanley (1853: 81) describe Turton as a "clever but eccentric conchologist, who by his energy and scholarship, gave a great impulse to the study of our native shells". But, in referring to Turton's collections, they add: "A close examination of them has shown that Turton was not always to be relied upon his published statements, and that a severe and critical judgment must be applied to his labours in conchology." This statement has strengthened my doubts as to Turton's description of *Testudo imbricata* actually having been based upon the specimen from the river Severn.

Ue 4, 27.v.1827, alive, River Parret (Somersetshire).

Baker (1851: 116-118), J. Jones (1865: 157), Cooke (1865: 174; 1893: 173), Lyell (1868: 366; 1872, 1875: 369), Witchell & Strugnell (1892: 126): *Chelonia imbricata*.

G. A. Boulenger (1906: 139): *Chelone imbricata*.

Taylor (1948: 10, 26; 1963: chart 8), M. A. Smith (1951, 1954, 1964, 1969: fig. 84): *Eretmochelys imbricata*.

In discussing this record, Baker (1851: 117) quotes from a letter, written to him many years earlier by his friend Mr. Anstice. In this letter, Anstice states, inter alia: "I have seen the species in question on the coast of Portugal." The common species of turtle on the Portuguese coast is the Loggerhead, and if the turtle from the River Parret was like those seen by Mr. Anstice in Portugal (as may be surmised from his letter), it will have been a Loggerhead, rather than a Hawksbill. In this connection it may be pointed out that *Eretmochelys imbricata* has not yet been recorded from Portugal; at least it is not mentioned by Bocage (1863), Boscá (1877, 1881a, b), Sequeira (1886), Ferreira (1892, 1893), Ferreira & De Seabra (1911), Nobre (1935), Themido (1942), Pissarro (1958), nor is it mentioned from the adjoining Spanish coast by Lopez Seoane (1877, 1884)⁶. Oliveira (1896: 29, *Chelone imbricata*) is of the opinion that the species might be found in Portugal. However this may be, as Baker does not mention any characters that might enable us to make an identification, I consider this turtle as not identified.

Ue 5, ca. 1944, alive, St. Agnes, Isles of Scilly (Cornwall).

Ue 6, Ue 7, 1946, alive, St. Agnes, Isles of Scilly (Cornwall).

"Scillonian", 20, 85, Easter 1946: 21; fide P. Z. Mackenzie, in litt., 16.xi.1955.

"Recently two hawksbill turtles were found on St. Agnes on two different beaches on two different days. One turtle was small but neither seemed to be full sized. About two years ago Miss D. E. M. Legg found a similar one. Mr. Herbert Legg, her brother, found the recent one".

Mr. P. Z. Mackenzie (in litt., 15.xi.1965): "I have been in touch with Mr. Legg — he remembers all the turtles were alive when found. One was about 1 ft. in diameter and one was found in deep seaweed on the beach at St. Warna's Cove presumably in winter. Mr. Legg does not remember how or why they were identified as Hawksbill Turtles."

Ue 8, 6.xii.1953, Broadsands near Paignton (Devon).

"Western Morning News", 8.xii.1953 (not seen); "Paignton News", 12.xii.1953; Venables (1954).

Mr. E. M. Venables, in a letter of December 11th, 1953, quotes the information, which he received from the editor of the "Western Morning News": "This turtle was found on December 6 on Broadsands Beach,

⁶ It is true that Lopez Seoane (1865: 44) mentioned *Chelonia imbricata* as occurring in the Ría del Ferrol, but in his subsequent papers (1877, 1884) this species is not mentioned, and in its place *Thalassochelys caretta* is recorded (Ca 143).

Paignton, by Mr. W. W. Polley of 64 Hele Road, Torquay. It was not identified, and at first appears to have been helpless through being covered with barnacles. These were washed off, and the turtle made its own way back to sea."

In his letter of December 13th, 1953, addressed to the British Herpetological Society, Mr. E. Harris, Paignton, wrote as follows: "... with regard to the turtle seen on Broadsands it was without doubt what I have already heard it named a 'Hawksbill' turtle ... I examined it closely and as I could not stimulate any movements of the limbs, concluded that it was lifeless, probably drowned. It was closely festooned with barnacles around the carapace and on the plastron and what was worse for the creature was a cluster on each flipper. With such encumbrance I formed the opinion that it had become exhausted in its efforts to float and I much doubt whether it had much in the way of voluntary propulsion, with four or five barnacles at the tip of each paddle. Being a young one it is surprising that it survived."

The turtle was "put back in the sea by a fisherman, who apparently did not understand that the Paignton Zoo wanted it kept until officials arrived" ("Paignton News", 12.xii.1953).

This turtle is recorded by Taylor (1963: chart 8) as *Eretmochelys imbricata*, but none of the reports, referred to above, mentions any pertinent feature that would make an identification possible. The experience with other reported "Hawksbills" has made me wary, and hence I place this turtle with the unidentified specimens.

Ue 9, Turton & Kingston (1830: 85, *Testudo imbricata*), in dealing with the fauna of the district of Teignmouth, Dawlish and Torquay, refer to the Hawksbill and the Leathery Turtle as follows: "can only (if at all) be claimed as an accidental straggler". The reference is cited by Hopkins (1957: 201). There is no evidence that the species had been found in the district at the time.

Ue 10, 1872, 30 miles off Beachy Head.

A. W. L. (1872: 112) wrote: "A young Hawksbill Turtle (*Chelonia imbricata*) was a few days ago exhibited in the streets of Hastings. It had been caught by a fishing-boat thirty miles off Beachy Head. The occurrence of this turtle in British waters is of a very rare occurrence. The carapace of this individual was about a foot long."

No identification can be made, but it seems more likely that a juvenile Loggerhead or perhaps a Kemp's Ridley was taken.

The information was published in the May number of Science Gossip of

1872. This number acknowledges correspondence received up to April 15th and, therefore, it seems likely that the information about the turtle was received some time between March 15th and April 15th and that the turtle was taken in a period extending from a few days before March 15th to a few days before April 15th.

Ue 11, summer of 1849, dead, between Redcar (Yorkshire) and Hartlepool (Durham).

Rudd (1850: 2707), Cooke (1893: 173), Grabham (1907: 321): *Chelonia imbricata*.
Roebuck (in W. E. Clarke & Roebuck, 1881: 91): *Chelone imbricata*.

Taylor (1948: 10, 26; 1963: chart 8), M. A. Smith (1951, 1954, 1964, 1969: fig. 84): *Eretmochelys imbricata*.

Rudd (1850: 2707) writes: "During my absence from Redcar last summer three of our fishermen, on their passage from that place to Hartlepool, found a large specimen of the hawks-bill turtle of Bell, floating dead upon the sea."

No indication is given as to how the identification was made, and by whom. The reference to Bell is of no great value. It must be remembered that Th. Bell (1838, 1849) gave figures of only two species of turtles: the Hawksbill and the Leathery Turtle. A person with no further knowledge of turtles, probably would place any turtle with horny shields on its shell with the Hawksbill.

Although various authors have accepted Rudd's identification, I do not see any argument in his account that warrants identifying this specimen with the Hawksbill.

Attempts to obtain information about this turtle from contemporary sources failed. The turtle is not mentioned in "The Yorkshire Gazette" (June to September, 1849), nor is it mentioned in the "Report of the Yorkshire Philosophical Society" for 1849 and 1850 (Mr. O. S. Tomlinson, in litt., 4.v.1967).

CHANNEL ISLANDS

Ue 12, 1948 alive, St. Ouen's Bay, Jersey.

Le Sueur (1949: 19): *Chelone imbricata*.

Le Sueur (l.c.) writes: "While playing on the beach in St. Ouen's Bay, the small children of Mrs. Kemp of Lighthouse View, Val de la Mare, found a small turtle tangled with sea-weed and in a very weak condition. It was acquired for the Société but died a few days after its capture. A dissection was made to ascertain its species, this being performed by Mr. B. G. G. Sandeman. The reptile proved to be a Hawksbill, and the skeleton is to be prepared for display".

When I visited the Jersey Museum on June 23rd, 1965, Mr. H. G. L. Amy made a search for this specimen in the Museum's laboratory and store room, but it could not be found, and it must be considered lost.

This turtle is not mentioned by Le Sueur (1961: 42) in his enumeration of turtle strandings in Jersey. It may have been the Hawksbill of which Noël-Hume (1954: 103) stated that "only a year or two ago a small specimen was caught off the Channel Islands".

FRANCE

Ue 13, spring of 1867, alive, Channel.

Couch (in: Bate, 1867: 277, 278), Couch (in: Bate, 1878a 469, repr.: 21; 1878b: 74): Hawk's-bill Turtle.

Chace (1951: 83): hawksbill turtle.

When dealing with the Crustacea of Cornwall and Devon, Couch states: "In the spring of the present year (1867) an example of the Hawk's-bill Turtle was taken in the Channel, at not a great distance from the French coast, and therefore not to be classed as British; but when brought alive and active to Polperro, there were found adhering closely under the shelter of the tail, two full-grown examples of the Crab *Planes linnaeana* . . ." (*Planes linnaeana* Leach, 1815 = *Planes minutus* (Linnaeus, 1758)).

Whether this really was a Hawksbill is doubtful; more likely it was a Loggerhead, but unless the specimen is still in some collection this cannot be checked.

Ue 14, viii.1836, alive, on the rocks opposite the village of Luc, at a spot named "le Petit-Enfer" (Calvados).

Eudes-Deslongchamps (1838: 279): *testudo imbricata*.

Gadeau de Kerville (1897: 153): *Chelone imbricata*.

The specimen was kept alive in fresh water for two and a half months. There is nothing in the original report that allows of an identification.

Ue 15, almost certainly about 1828 (Calvados).

Chesnon (1837: 31): Carret.

Gadeau de Kerville (1897: 497): *Chelone imbricata*.

After stating that ordinarily one does not find turtles on the Normandy coast, Chesnon (1837: 31) continues: "Cependant, il y a huit ans, des pêcheurs d'Arromanches en prirent une de l'espèce Carret, probablement égarée, et que j'ai dans ma collection". (Nevertheless, eight years ago, fishermen from Arromanches took one of the species Carret, which probably had gone astray, and which I have in my collection). Gadeau de Kerville (1897: 497)

mentioned it as being a Hawksbill, but there is no proof that this identification is correct.

VII. UNIDENTIFIED TURTLES, WHICH COULD NOT BE PLACED IN ANY OF THE PRECEDING GROUPS

Under this heading the turtles are listed, which in literature have not been assigned to any of the five species, or of which the identification is considered erroneous, and about which there is no definite evidence as to which species could have been meant.

NORWAY

Ue 1, 1744, alive, Sundelwens, Sundmoër.

Pontoppidan (1753: 299, note; 1754: 347, note 2; 1755: 184, note).

Heuvelmans (1965: 474; 1968: 418).

Brongersma, (1968f: 217): unidentified.

Pritchard (1971: 32): *Dermochelys coriacea*.

In the year 1744, Dagfind Korsbeek caught a monstrous fish. Its head almost resembled that of a cat, it had four paws, but no tail. Its body was encased in a shell as if it were a lobster. It growled and grunted, like a cat, and when one prodded it with a stick, it bit into this. The man believed it was a Troll and, therefore, he was afraid to keep it; after a few hours he put it back into the sea.

Pontoppidan (1753: 300, note; 1754: 348, note; 1755: 185, note) compares it to an American Armadillo, which it was said to resemble, except for the Armadillo having a long tail, and Pontoppidan suggested it to have been a Sea-Armadillo!

Primitive though Pontoppidan's description may be, I do not doubt that this 'fish' in fact was a turtle. The fact that no tail was seen may point to the specimen having been a female, in which the very short tail will have been covered by the shell. Of *Dermochelys coriacea* it is known that the breathing is audible; this was mentioned in the original reports on De 18, and it was reported for De 45.

Prof. E. Sivertsen, Trondheim, kindly checked the locality for me, and he informed me (in litt., 8.xi.1966) that it is the present-day Sundmöre (62°10'N, 7°E) in the Sundelfjord (sometimes written: Sunnelvfjord or Sunnylvsfjord), the inner part of the Storfjord.

GREAT BRITAIN

SCOTLAND

Un 2, Shetland.

In a letter of January 7th, 1945 (1946?), promising to make inquiries

about a turtle stranded at Unst (i.e., Ca 3), Mr. S. Bruce, of Lerwick, writes: "This to my knowledge is the second record for Shetland and as far as I can gather the first was a Loggerhead." No definite locality was mentioned for this Loggerhead, and no information is available whether it really was this species. The record is considered doubtful by me, and I have not marked it upon my chart.

Taylor (1963: chart 8) indicates two turtles for Unst, one Loggerhead and one unidentified turtle, but the chances are that these two records are based upon one and the same specimen, viz., the Loggerhead of 1945 (Ca 3) and an unidentified turtle mentioned by Mr. A. J. Clunes, of Lerwick, in his letter of October 21st, 1957 (Stephen, 1961: 43, no. 1). As Mr. Clunes mentions earlier records, it may be that the unidentified turtle from Unst (without any indication of the date) is in fact the Loggerhead of 1945.

Un 3, late 1920's, alive, Orka Voe (Shetland).

Un 4, late 1920's, dead, Tofts Voe (Shetland).

In his letter of March 13th, 1967, Mr. Jas. A. Young writes as follows: "Towards the end of the 1920's a sea-trout fisherman saw a Turtle swimming in an inlet on the east side of Shetland called Orka Voe and this may have already been reported to you as Mossbank. About a month after sighting two boys found the Turtle dead on shore above high-water mark it having died through being overcome by the first frost and snow of the winter. It had come round to another inlet nearer Mossbank proper. The inlet is known as Tofts Voe. The turtle was removed to a merchant's store at Mossbank for weighing when it was found to be 140 lbs in weight."

This will be the same turtle as that recorded by Stephen (1961: 43, no. 2) from Delting and Mossbank. Stephen received his information from Mr. A. J. Clunes, of Lerwick (in litt., 21.x.1957), who referred to the event as having taken place about twenty years ago, which would place it in the late 1930's. Although the exact date cannot be traced, I have accepted Mr. Young's indication of it, as his information is more precise. As there is no definite proof that the turtle sighted alive in Orka Voe is the same as that found dead about a month later in Tofts Voe, I have given the records the separate numbers 3 and 4.

Un 5, before May 18th, 1700, Ura Firth (Shetland).

Brand (1701, 1703: 116; 1809: 789; 1883: 174-175), Evans & Buckley (1899: 217): tortoise.

Guppy (1917: 41): turtle.

Brand (1701: 116) wrote: "Tho no Tortoises use to be found in all these Northern Seas, yet in *Urie-Firth* in the Parish of *Northmevan*, there was one found alive upon the sand in an ebb the Shell of it was given me as a present by a Gentleman of the Country, it was about a Foot length, and a large half Foot in Breadth. The inhabitants thought it so strange, never such thing having been found in these seas formerly, which ever they came to the knowledge of, that they could not imagine what to make of it, some saying it hath fallen out of some East India ship, sailing along the coasts, which looks not so probable."

The date "before May 18th, 1700" is based upon the fact that Brand arrived in Shetland on that date.

Taylor (1963: chart 8) has indicated an unidentified turtle off Lerwick, Shetland; through no fault of his, this is an error. The record in fact is based upon a specimen (Ucm 1) found on Burra Isle. The correspondence about this turtle came from Lerwick, and this has caused some confusion.

Un 6, 1920's, East side of South Ronaldsay (Orkney).

"The Orcadian", 25.ii.1965.

The only information available states the turtle to have been stranded.

Un 7, xii.1964, alive, off Halcro Head, South Ronaldsay (Orkney).

"The Orcadian", 25.ii.1965.

The turtle was sighted by two fishermen. They thought it was about three or four feet in length.

Un 8, Hebrides.

Pennant (1774: 266): American tortoise or turtle.

In his description of "Ilay" (Islay), Pennant states: "*American* tortoises, or turtle, have more than once been taken alive on these coasts, tempest-driven from their warm seas"

However, before mentioning the turtles, Pennant discusses the occurrence of tropical seeds, which by the current are conveyed to "the shores of the *Hebrides* or *Orknies*". Hence, "these coasts" mentioned in relation to the turtles may refer to Orkney, as well as to the Hebrides.

Necker (1809: 90; Gumprecht, 1854: 416; Guppy, 1917: 40) mentions having seen turtles shells ("écailles de tortue") in the Hebrides, the current having brought these turtles from the Antilles; see also Un 14.

Un 9, early in the summer of 1960, 8 miles ESE of the Butt of Lewis, Outer Hebrides (Ross & Cromarty).

Stephen, Rae & Lamont (1963: 38, no. 7): unidentified.

Sighted by the crew of the "Arcadia".

Un 10, about 22.x.1928, alive, washed ashore in Loch Seaforth, Lewis, Outer Hebrides (Ross & Cromarty, and Inverness).

Stephen (1953: 109, 110, no. 8): unidentified.

Carapace, long 2 feet 9 inches (838 mm), wide 2 feet 3 inches (686 mm); total length, from tip of snout to tip of tail, 3 feet 9 inches (1143 mm); weight about 170 lb. (ca. 77.3 kg).

"The suggestion in the correspondence that it was a green turtle cannot be taken as a satisfactory identification."

Un 11, 1961, off the island of Canna (Inverness).

"The Press & Journal", 13.vii.1962.

The only information available is the statement "Mallaig ship chandler Mr. Andrew Johnson said that fishermen had reported seeing a turtle off Canna last year (1961)."

Un 12, 1961, off Mallaig? (Inverness).

"The Press & Journal", 13.vii.1962.

When dealing with the turtle mentioned above under Un 11, the "Press & Journal" added "and a small one was landed that summer." No further information could be obtained.

Un 13, Island of Col[1] (Argyll).

Pennant (1777, 1789: 47).

"TORTOISE. I have been informed that one had been taken near the isle of Col, but suppose it to have been a tortoise that had escaped out of some *West Indian* wreck."

Un 14, Island of Coll (Argyll).

Necker de Saussure (1821: 400).

When Necker de Saussure visited the island of Coll in the first days of September, 1807, he was shown the shell taken from a turtle that had been washed ashore on the island. It was probably this shell and the information given him at Coll, which made Necker (1809: 90) mention turtles being

washed ashore in the Hebrides as evidence of the existence of the great current (i.e., the Gulf Stream).

Un 15, 10.viii.1959, off the Island of Coll (Argyll).

Stephen (1961: 44, no. 7): unidentified.

A sight record by Mr. Stewart, skipper of the "Alliance".

Un 16, early in February 1954, Island of Kerrera (Argyll).

Stephen (1961: 43-44, no. 3): unidentified.

"Early in February 1954, a small turtle was reported in the *Weekly Scotsman* as having been washed ashore on the Island of Kerrera, near Oban. Efforts to secure the specimen, or find more about it, proved unsuccessful."

Un 17, 8.ix.1958, alive, Loch Long off Benny Shore, Portincaple (Argyll).

Stephen (1961: 44, no. 6): unidentified.

A sight record by Mrs. K. Rosamond Jex Long: "a creature surfaced within an oar's length of the boat. It appeared to have a shell on its back and a beak. It sank again immediately and no further particulars were obtained."

Un 18, 16.viii.1947, alive, 5 miles from the islands of Sanda (off the Mull of Kintyre) (Argyll).

"Sunday Express", 17.viii.1947; "The Times", 18.viii.1947.

Anonymus (1947): possibly *Chelone midas*.

Stephen (1953: 109, 110, no. 11): unidentified.

A sight record by the crew of the "M'Murrar", skipper-owner Mr. Michael O'Hara, of Campbelltown. The turtle was estimated to be about four feet (ca. 122 cm) long. Anonymus (1947) considers it possible that this turtle was "the green *Chelone Midas*", but there is nothing in the reports that justifies this identification.

Un 19, xi.1829, alive, Southernness, a village on the Solway (Kirkcudbrightshire).

Service (1888: 165; 1896: 175; 1902: 210), Taylor (1948: 9, 26; 1963: chart 8), M. A. Smith (1951, 1954, 1964, 1969: fig. 84), Stephen (1953: 109, 110): unidentified.

Service (1888: 165) writes: "A Turtle was captured at Southernness, having been cast ashore alive, in November 1829, and was sent to a Dumfries hotel-keeper for the purpose of making soup! The exact species cannot now be determined." As stated by Stephen, the fact that it was to be used for making soup, points to its being a well-grown specimen.

Un 20, 31.v.1960, at sea off Fast Geo, N of Freswick Bay (Caithness).

Stephen, Rae & Lamont (1963: 38, no. 6): unidentified.

Un 21, 1.xi.1955, at sea off Cove Bay, a few miles S of Aberdeen (Kincardine).

Stephen, Rae & Lamont (1963: 38, no. 4).

Sighted by the crew of the seine-netter "Halcyon."

Un 22, 27.viii.1959, outer Tay Estuary (Angus, Fife).

R[ae] (1959: 22), Stephen (1961: 44, no. 8), Taylor (1963: chart 8): unidentified.

The turtle was observed by fishermen at the surface in the outer Firth of Tay (R[ae]). It was estimated to be about four feet long (Stephen).

ENGLAND

Un 23, 19.vi.1960, River Dee, off Hilbre Island (Cheshire).

A sight record by Mr. and Mrs. Donald Edwards and their son, reported to the British Museum (Natural History) by Mr. Norman F. Ellison (in litt., 17.xii.1960). The shell was stated to be about four feet (ca. 122 cm) long, smooth, "humped like our tortoise", colour khaki-brownish. The plates looked "squarish with rounded black markings in the centre of each." Mr. Edwards's son said: "It's spotted like a leopard." "The head, neck, tail and flippers were dark elephant gray".

For further records from England see Un 29-40.

WALES

Un 24-Un 25, alive, W. coast of Anglesey.

Mr. P. M. A. Plews (in litt., 8.xi.1967) writes that besides the Leathery Turtles De 34, De 35, and the Loggerheads Ca 15, Ca 16, he saw two further turtles at different times. As these turtles were far away, no definite identification could be given.

Un 26, towards the end of ix.1923, alive, W. coast of Anglesey.

From his late father, Mr. P. M. A. Plews (in litt., 8.xi. and 1.xii.1967) learned that towards the end of September 1923 a large turtle was washed ashore alive. It was very large and somewhere between seven to eight feet in length. Apparently it died on the beach, and after a few days it was washed out to sea again.

The size would point to its being a Leathery Turtle, and it would be one of the very rare cases of such a turtle having been washed ashore alive in British waters.

Un 27, viii or ix.1960, dead, Druidstone Haven, St. Bride's Bay (Pembrokeshire).

Mr. John H. Barrett (in litt., 21.ix. 1960), when reporting the record of a Leathery Turtle (De 37) sighted in St. Bride's Bay on September 11th, 1960, added: "three weeks ago another turtle was washed ashore dead: Druidstone Haven, so battered that identification was impossible."

Un 28, 1960-1963, Bristol Channel.

Anonymus (1966d: 19) mentions information received from Dr. A. Nelson-Smith, of Swansea University College, that some years ago a small green turtle had been sighted in the Bristol Channel. Dr. Nelson-Smith (in litt., 1.ii.1967) writes: "A research student who worked in this department in 1960-1963 used to make trips on a local inshore trawler . . . On one of these trips he had seen what was quite certainly a small turtle of a greenish colour; the trawlerman then said that he and other boats had seen it before but had not been believed."

From this further information it becomes evident that the "green turtle" of Anonymus (1966d: 19) was a greenish turtle rather than a specimen of *Chelonia mydas*. Dr. L. C. Llewellyn, who was believed to have been the research student referred to by Dr. Nelson-Smith, informed me (in litt., 12.ix.1967) that he had never seen a turtle in the area. Thus, the record remains very vague.

ENGLAND (continued)

See also Un 23.

Un 29, 5.vii.1967, alive, Woody Bay, near Lynton (N. Devon).

Mr. Alec Worth (in litt., 6.vii.1967): "Yesterday while bird-watching at Woody Bay, near Lynton, N. Devon, I saw a turtle close inshore swimming lazily westward with the current. I took little notice at first as I thought it was a large plastic bag or some other flotsam. When I did eventually focus my binoculars on it I was able to see the flippers and the head under water and the greenish colour of the carapace. At an estimate I would say it was 2'6" in length. Unfortunately it chose this moment to dive and only surfaced once more. The numerous gulls, Razorbills and Guillemots took no notice of it."

Un 30, 27.iv.1970, dead, Welcombe Mouth (North Devon).

A. F. Stimson (in litt., 4.v.1970); D. Garrett (in litt., 19.v.1970).

The first report upon this turtle was passed by telephone to the British Museum (Natural History) by Mr. D. Garrett, Receiver of Wreck, Appledore, and later further information was received. Mr. Garrett (in litt., 19.v.1970) wrote as follows:

"This one was more decomposed, but the skin still appeared to be leathery, rather than scaly. I think however that you will find the report of this one to be the more interesting, for although it had lost both its head and flippers — only the small flipper at the rear remaining — my patrolman in fact did measure the remains and found the length to be 33 inches and about 18 to 20 inches across. This I feel would also be in keeping with his estimated weight of 1½ cwt. There was also evidence of a wound or gash in the side between the front and rear flippers."

The carcase was destroyed by burning.

The remark that the skin was "leathery, rather than scaly" would indicate that it was a Leathery Turtle, but the measured length of 33 inches makes this unlikely. Moreover, the observer did not mention ridges on the shell, such as are present in the Leathery Turtle. It must be remembered that the specimen was partly decomposed already (head and flippers lost), and it may well be that the horny scutes had become lost. In turtles that have the carapace covered with scutes, decomposition may cause the scutes to drop off, and then the skin under the scutes becomes visible, and I have noticed in one specimen at least that this skin gives the impression of being leathery. Therefore, I believe the Welcombe Mouth turtle to have been a Loggerhead in a far gone state of decomposition. However, my arguments for this opinion being fairly weak, I believe it best to include this turtle with the unidentified specimens.

Un 31, ca. 10.xi.1938, alive, St. Ives (Cornwall).

"Daily Mirror", 6.xii.1938: Mexican Turtle.

"The Times", 16.i.1939: 9, col. 4; H. W. Parker (1939b: 127): unidentified.

The specimen was destroyed before a definite identification could be made. Mr. Cecil Thomas, in his letter of February 11th, 1939, wrote to the British Museum (Natural History) as follows: "I find on enquiry to the local fisherman, who kept this alive for several weeks, that it died about three weeks ago. He cleaned the shell as best as he could and put it in his net cellar to dry. The female members of his household, with their usual keen noses, denounced it as a nuisance and after setting upon it with coal hammers chucked the whole lot into the sea."

Un 32, 1955, Mousehole (Cornwall).

Mr. R. D. Penhallurick (in litt., 7.viii.1971), Mr. R. D. Carswell (in litt., 24.viii.1971), Mrs. D. M. Carswell (in litt., ix.1971).

The turtle was found at the same time as Ca 26 bis, but Messrs. D. B. & R.D. Carswell did not preserve any part of it. It was stated to have been

smaller than Ca 26 bis, and to have been covered with crude oil. For remarks on the possible time of the year I may refer to what has been said under Ca 26 bis.

Un 33, 3.i.1866, alive, on the beach at Hemmock, one mile to the westward of Dodman Head (Cornwall).

Willimott (1866*a*, 1866*b*): "On Jan. 3 as some children were playing on the beach at Hemmock, one mile to the westward of Dodman Head, they saw a turtle endeavouring to make its way up a small stream of water which flows across the beach into the sea; having fetched a gaff from their cottage, they hooked it out of the stream and secured it. I saw it on the following day, and its weight was 23 lb [ca. 10.5 kg]. It was taken to Megavissey, and bought by a fisherman there to send to London market. If, therefore, its shell is wanted by any collector the purchaser in town might probably be traced. I believe the turtle is numbered amongst our British reptiles; but whether this species crossed the Atlantic, being driven here by the fierce south and south-westerly winds we have had this autumn or whether it was swept from the deck of some homeward-bound ship, must be a mere matter of conjecture."

Un 34, 18.vi.1967, alive, Wiggler Reef at the southern end of Falmouth Bay (Cornwall).

"Daily Telegraph", 21.vi.1967; K. Saunders (in litt., 5.vii.1967).

The shell was estimated to be four feet long and about two to three feet wide. Mr. Saunders writes that the colour of the shell was a deep shade of green; "The shell was covered by what you call "large horny scutes", or in other words, a shell like a land tortoise, only dark green. It raised its head and this also to us looked like a tortoise. I don't think that it had any pronounced ridges or keels, just the sort of pattern, as I have said, of the land tortoise. The only thing being that with this turtle the deep green colour blended more as one whole, unlike the obvious pattern and colours of the tortoise."

The turtle was observed from a distance of about forty yards.

An identification is impossible. From its size one might have taken it to have been a Leathery Turtle, but the statement that it had a shell like a land tortoise suggests that it might have been a large Loggerhead.

Un 35, 1963?, Weymouth Bay (Dorsetshire).

Miss E. M. Samuels (in litt., ii.1965): "There have been no reports in our Proceedings of Turtles since 1954 but I think in 1963 there were some vague reports of Turtles seen in Weymouth Bay but as we could not confirm the

details of these reports we did not print them. These were newspaper reports and we were unable to find out the actual observers."

I have not been able to trace the newspaper that published the report. This very doubtful record is included only for the sake of completeness.

Un 36, 11.xii.1938, Bexhill-on-Sea (Sussex).

"The Times", 16.i.1939: 9, col. 4; H. W. Parker (1939a: 121; 1939b: 127), Taylor (1948: 11, 26; 1963: chart 8), M. A. Smith (1951, 1954, 1964, 1969: fig. 84): unidentified.

Un 37, ca. 29.ii.1940, Hastings (Sussex).

"The Evening News", 29.ii.1940.

"Two evacuated boys found a live 2 ft. turtle on the beach near the fish market at Hastings. They carried it with difficulty to a shellfish merchant, who exhibited it in his shop." The photograph, published with this item, is not clear enough to recognize the species. According to the "News Chronicle" (1.iii.1940), the turtle was released.

Un 38, vi.1870, the Downs.

"Hull News", 28.x.1871; "The Hull and Eastern Counties Herald", 2.xi.1871: 7.

Both papers wrote: "In June, 1870, a large turtle was caught in the Downs, and taken into Ramsgate. It was a puzzle to all who saw it as to how it came there. Some supposed that it might have got into the Gulf Stream; while others thought it had come with a ship that had been wrecked".

Un 39, 1871, on or near the Dogger Bank.

E. H. Clark (1871: 336) wrote: "I find that the crew of the well-boat Start, while fishing for codfish near or on the Dogger Bank, hooked a turtle on one of the lines, which weighed about 25 lb. It was sold in Grimsby, and sent into Yorkshire. Can you or any of your correspondents account for the fish being so far away from home?"

The letter passing this information to "Land and Water" was dated May 6th, 1871, and hence the event probably took place towards the end of April or in the first days of May.

Un 40, 1748 or 1749, off Scarborough (Yorkshire).

Pennant (1769: 321; 1776a: 331; 1776b: 379): Tortoise.

Goldsmith (1791: 360; 1804: 27; 1805, 1816: 191): most probably Great Mediterranean Turtle.

Goldsmith (1833: 32; n.d.a: 32; n.d.b, c: 317): most probably Great Mediterranean Turtle (or Coriaceous Turtle).

Goldsmith (1840, 1862: 342): most probably Great Mediterranean Turtle (or Coriaceous Turtle), also named the Leathery Turtle.

Pennant (1812: 10; 1818: 8): Coriaceous Tortoise.

Th. Bell (1838: 15; 1849: 16): *Sphargis coriacea*.

Roebuck (in: W. E. Clarke & Roebuck, 1881: 94): not identified.

Rope (1934: 210): *Dermatochelys coriacea*.

Pritchard (1971: 32): *Dermochelys coriacea*.

About this turtle Pennant wrote: "The late Bishop of *Carlisle* informed me that a tortoise was taken off the coast of *Scarborough* in 1748 or 1749. It was purchased by a family at that time there, and a good deal of company invited to partake of it. A gentleman, who was one of the guests, told them it was a *Mediterranean* turtle, and not wholesome: only one of the company eat of it, and it almost killed him, being seized with a dreadful vomiting and purging" (1769: 321; 1776a: 333; 1776b: 379). In the margin Pennant placed the cross-reference: "Tortoise, page 1" (1769; in the 1776 editions the reference is to p. 7), apparently referring to the general paragraph "Tortoise" on that page. In the three editions issued during Pennant's life (1769, 1776a, 1776b), the Scarborough turtle is mentioned in the Appendix to the third volume of his "British Zoology", but in the editions issued after his death⁷⁾ (1812, 1818) the information is included in the text⁸⁾ dealing with the Coriaceous Turtle. This was done apparently by the editor of these editions, who thus identified it with the Leathery Turtle, an identification never made by Pennant himself.

There is nothing in Pennant's original report that gives any indication as to which species was taken off Scarborough, except perhaps the statement that it was a "*Mediterranean* Turtle". It is true that Goldsmith used the name Great Mediterranean Turtle for the Leathery Turtle, but it is far from certain that Pennant used the name "*Mediterranean* Turtle" in the same sense. Although Pennant in his article on the Coriaceous tortoise states that it is "common to the *Mediterranean*, and our southern seas", this does not mean that he considered the Leathery Turtle the only species occurring in the Mediterranean, because in another paper (Pennant, 1772: 267, note) he wrote: "There are two species of Tortoises in that sea, a coriaceous one, and another resembling that of the West Indies, which is scarce eatable. The last I procured from Leghorn, and at this time am doubtful whether it differs specifically from the West Indian Turtle." Pennant's turtle from Leghorn was figured and described by P. Brown (1776: pl. xviii fig. 3, p. 115: "La Tortue de la Méditerranée", p. 116: "The Mediterranean Tortoise"), and

7) Pennant died 16.xii.1798.

8) The editor made some stylistic changes in the text.

this definitely is a Loggerhead (*Caretta caretta*). It may well be that the gentleman, who stated the Scarborough specimen to be a "*Mediterranean* turtle", thought of the Loggerhead, rather than of the Leathery Turtle.

The fact, that the one person eating of the Scarborough turtle became severely sick, is not a character by which the species can be identified; it sounds more like a case of food-poisoning by eating tainted meat. Under De 124 I have already mentioned that the Leathery Turtle can be used as food, and the same applies to the Loggerhead. Pennant states, in his article on the Coriaceous Tortoise, that the Carthusians ate only this species, but it is open to some doubt whether this information is correct. In dealing with the Loggerhead (*Caretta caretta*), Schoepff (1793a: 70; 1793b: 79) states, that although the flesh of this species does not taste very good, it is an agreeable dish to Italian monks (1793a: "Nihilominus jucundum praebebat ferculum monachis Italis"; 1793b: "Unterdesen ist sie doch den italienischen Mönchen ein angenehmes Gericht"). If the Carthusians made a habit of eating turtle, it is more probable that they used the Loggerhead, which is much more common in the Mediterranean than the Leathery Turtle. Perhaps the remark about the Scarborough turtle, that it was "not wholesome", refers to the Loggerhead, which Pennant (1772: 267, note) considered "scarce eatable."

However this may be, Pennant did not identify the Scarborough specimen, and the fact that the editor of the 1812 and 1818 editions placed it with the Coriaceous Tortoise misled Th. Bell (1838: 15; 1849: 16) and Rope (1934: 210).

I rather follow Pennant in not identifying this turtle.

Attempts to obtain some more information about this turtle from contemporary sources failed. It is not mentioned in "The York Courant" of 1748 or 1749 (Mr. O. S. Tomlinson, York, in litt., 4.v.1967).

EIRE

Un 41, shortly before 13.i.1932, alive, Liscannor, Co. Clare.

Mr. E. E. O'Riordan (in litt., 27.viii.1971).

The turtle had been stranded alive; its margin was said to be indented. It will have been either a Loggerhead or a Kemp's Ridley.

Un 42, ca. 12.vii.1849, Cork.

Thompson (1856: 63), Praeger (1950: 206): not identified.

Thompson quotes as follows: "Northern Whig" 12th July 1849: A fine young turtle was caught in the Channel, contiguous to the City. Cork Constitution."

Un 43, after second world war, alive, off Piper's Point, Castletownbere (Co. Cork).

Sergeant Michael Sullivan (in litt., 27.i.1966), writes: "I learned that a Mr. Joseph Harrington, of Drom South, Castletownbere, picked up what is believed locally to have been a green-backed sea turtle off Piper's Point, Castletownbere, "after the second World War". It weighed about 3 cwts. Mr. Harrington kept it in Castletownbere Harbour for about a week while he offered it to parties whom he thought might be interested, including the Zoological Gardens, Phoenix Park, Dublin. While it was held local people fed it with cabbages, etc. On failing to find any interested party Mr. Harrington released it in Castletownbere (Bear Haven) Harbour and it, or one very similar, was seen about two weeks later in Pullen Harbour." Neither Mr. Harrington, nor any other person at Castletownbere could remember the exact date of the capture. The Royal Zoological Gardens, Dublin (in litt., 22.ii.1966) inform me that no information about Mr. Harrington's offer is to be found in the files, and, thus, this attempt to check the date also failed.

GERMANY

Un 44, 13th century, coast of Germany.

Albertus Magnus (ca. 1252 (or after 1262); in Stadler, 1921: 1521, no. 19): Barchera.

Stadler (1921: 1609): *Chelonia cephalo*.

Albertus Magnus (ca. 1252 (or after 1262); in Stadler, 1921: 1547, no. 126): Tortuca maris.

Balss (1947: 262): wahrscheinlich unechte Karettschildkröte.

Twice Albertus Magnus dealt with turtles (Barchera, Tortuca maris), and once with an animal that may well have been a turtle (Zytyron, see Ut 7).

When editing "De Animalibus" of Albertus Magnus, Stadler (1921) indicated what the author had taken from the writings of others (e.g., from Thomas of Cantimpré's "De Natura Rerum"), and what had been added by Albertus Magnus. In this respect there is a difference between the description of the Zytyron, and that of the Barchera and of the Tortuca maris. The account of the Zytyron contains (in a somewhat changed wording) what Thomas of Cantimpré wrote about it, but the descriptions of the Barchera and of the Tortuca maris contain passages, which were added by Albertus Magnus. There would be no reason to discuss the Barchera and the Tortuca maris in the present paper, but for these additions.

There is no doubt that the Barchera is a turtle, but the problem is whether it can be more definitely identified. To the original, vague description, Albertus Magnus adds that the head is covered with horn, after the way of a helmet. This remark places the Barchera with those turtles that have horny scutes.

This will have led Stadler (1921: 1609) to identify the Barchera with *Che-
lonia cephalo* (i.e., *Caretta caretta*), an identification which is also considered
as probable by Balss (1947: 262).

However, some details in the description by Albertus Magnus do not fit
in very well with this identification. This author states that the shell may
grow to a length of eight or nine feet. Either this is gross exaggeration, or
it may have been due to confusion with the total length of the Leathery
Turtle. The statement that the four feet show many digits does not fit any
turtle at all. Furthermore, Albertus Magnus writes that the carapace is com-
posed as it were of five stakes or slats ("Est autem scutum eius ac si de
quinque asseribus sit compositum"). The meaning of this sentence is not
wholly clear to me, unless it is again a reference to the Leathery Turtle,
and that with the slats are meant either the raised keels on the carapace of
Dermochelys coriacea, or more likely the interspaces between the keels.
Indeed, the carapace of the Leathery Turtle might be well compared to the
hull of a boat, composed of five boards, the keels being the seams.

Albertus Magnus writes that the Barchera is known to the fishermen of
Germany and Flanders as the 'knight', because it has a shield and a helmet.

To the description of the Tortuca maris, Albertus Magnus made two addi-
tions, viz., that the people in Germany called it the 'knight' (see also Ut 7),
and that in structure it is like a (land) tortoise.

It may further be mentioned that Albertus Magnus (in: Stadler, 1916:
528) also refers to the presence of "milites mares" and "tortucae maris" in
"nostra maria" (i.e. the North Sea, and northern Atlantic Ocean).

Whether the Barchera is a composite, based partly on the Loggerhead and
partly on the Leathery Turtle, or whether it only refers to the Loggerhead (or
another species with horny scutes) taken together with the remarks upon the
Tortuca maris, it is clear that turtles with horny scutes were known on the
coasts of Germany and Flanders. It is remarkable, however, that since the
thirteenth century only once a turtle (De 71) seems to have been recorded
from the German North Sea Coast.

Un 45, iv.1971, alive, Valkenisse, island of Walcheren.

"Provinciale Zeeuwse Courant", 24.iv.1971, 15.v.1971.

The turtle was caught by Mr. Meisner, of Volmarstein, Germany. It was
put in freshwater, and when after a few days it had died, Mr. Meisner decided
to take the turtle with him, to have it preserved. After some time the speci-
men became rather smelly and the owner buried it. It can only be said that
it was either a young Loggerhead or a young Kemp's Ridley.

The capture of this turtle was reported by Mr. Chr. Schreyenberg, of

Goes, to Mr. J. C. Wedts de Swart, who wrote the item for the newspaper, and who helped me to trace the owner.

BELGIUM

Un 46, 13th century, coast of Flanders.

Albertus Magnus (ca. 1252 (or after 1262); in: Stadler, 1921: 1521, no. 19): Barchera.

Stadler (1921: 1609): *Chelonia cephalo*.

Balss (1947: 262): wahrscheinlich unechte Karettschildkröte.

For a discussion of this record, see Un 44.

FRANCE

Un 47, first half of 14th century, Boulogne-sur-mer.

Petrus Berchorius (ca. 1325; ed. 1731: 291): "Ego etiam scutum unum semel vidi latum & forte, quod constabat de squama piscis esse, & dicebatur a nonnullis marini militis fuisse. Tale vero scutum, a quodam maximo monstro seu milite marino extortum, apud Boloniam in Galliis fertur esse"

The statement that the broad and strong shield consisted of "fish scale", points to its being the carapace of a turtle with horny scutes.

Un 48-Un 49, Dieppe (Seine-Maritime).

C[loquet] (1817: 373) when dealing with the Green Turtle, mentions having seen two or three small specimens which came from Dieppe during the last years. As Cloquet placed the Leathery Turtle from Dieppe, 1752 (De 76) with the Green Turtle, little value can be attached to his identification, and there is nothing in his article to show that the small specimens were Green Turtles.

Un 50, alive, Port-en-Bessin (Calvados).

Eudes-Deslongchamps (1838: 280) mentions a very large turtle that had been found alive on the rocks at Port-en-Bessin; he received this information from Mr. de Magneville, who in his turn had been told about it by his late father.

Un 51, ca. 1962, Belle-Isle-en-Mer (Morbihan).

Mr. Jean Barbaroux (in litt., 4.iii.1965).

Un 52, 1960, some kilometres off Cap-Ferret (Gironde).

Mr. C. Cazaux (in litt., 12.iii.1965) writes that the crew of a trawler from Arcachon twice sighted a very large turtle, which dived when they approached. Both times they took it for a boat, bottom-up, with a human head sticking out of the bows.

SPAIN

Un 53-Un 54, ca. 1747, costa de Redes, Ría de Ares (Prov. la Coruña).
Cornide (1788: 114).

When writing about the Loggerhead Ca 128, captured in 1787, Cornide adds that Don Gaspar Maldonado, of Puertedeume, assured him that about forty years earlier (hence, ca. 1747) two turtles had been captured on the costa de Redes, and as far as he (Maldonado) remembered they were not less than "una vara" in length, i.e., not less than ca. 836 mm (the Castilian vara is equivalent to 835.9 mm). Redes is a small town on the Ría de Ares, in about $43^{\circ}25'28''\text{N}$, and $8^{\circ}12'13''\text{W}$. Probably these turtles were Loggerheads as well, but as the Green Turtle has also been observed on the Galician coast, no definite identification of the turtles observed off Redes can be made.

VIII. UNIDENTIFIED ANIMALS, WHICH MAY HAVE BEEN TURTLES.

In the preceding lists records have been given of animals that undoubtedly were turtles, be it that in a number of instances no identification as to the species could be made. There remain a number of records based upon marine animals that may have been turtles, but which have passed into the literature on the 'Great Sea Serpent' (e.g., Oudemans, 1892; Heuvelmans, 1965, 1968). In a previous paper I expressed the opinion that various records of 'Great Sea Serpents' may have been based upon sightings of Leathery Turtles, of which the observer has exaggerated the size and of which his account gives a distorted picture. Thus, the many records from the waters off the coast of New England of a Great Sea Serpent, which Oudemans (1892) considered to be a long-necked, long-tailed Pinnipede, and for which he used the name *Megophias megophias* (Rafinesque), and which Heuvelmans (1965: 647; 1968: 568) places with the Archaeoceti (although it also could be a Sirenian, Heuvelmans, 1965: 645, note 2; 1968: 566, note 2), and for which he proposed the name *Plurigibbosus novae-angliae* in my opinion are based upon *Der-mochelys coriacea* (cf. Brongersma, 1968f). It is not my intention to try and list all Great Sea Serpents from European Atlantic waters, which may in reality have been Leathery Turtles, for I do not want to burden the lists of records with a number of data that may be of doubtful value and that certainly well be considered extremely doubtful by others. From the many records of unidentified animals that may have been turtles I have selected a few, just to draw attention to the possibility that a careful and critical checking of records of sea monsters may perhaps help to obtain a more complete picture of the distribution of turtles in European waters.

ICELAND

At various times sea monsters have been reported from Iceland, and some of these reports may have been based upon turtles. The fact that *Dermochelys coriacea* has been recorded from Iceland makes it not unlikely that the following two records were based upon Leathery Turtles. However, the reports are so vague that it would be unsafe to go any further than just mentioning that the animals may have been turtles, the size of which was exaggerated.

Ut 1, 1595, alive, river Hvítá, near Skalholt.

Olafson (Olafsen, 1775: 143-144; Olafson, 1802: 57-58), Heuvelmans (1965: 78; 1968: 109).

On a Sunday in 1595, some people returning from the church at Skalholt, when crossing the river Hvítá in a ferry, saw a monster as large as a house, with a head like that of a seal, and the back set with high points (Olafsen, 1775: 143-144). In the French text (Olafson, 1802: 58) it is further stated that the posterior part of the body was shortened ("raccourci"), and that it moved at great speed, eventually diving under water.

The points on the back may have been turbercles between the notches in the keels, in which case it may have been a Leathery Turtle. The fact that the animal was observed in a river does not exclude the possibility that it was a Leathery Turtle, for sometimes this species does enter rivers (cf. De 141, De 142).

Ut 2, 13.ii.1963, alive, Vopnajörthar.

Heuvelmans (1965: 600, 665, fig. 115; 1968: 525, 585, fig. 125).

A strange creature was observed by Agust & Sigurjón Jónsson. Two humps appeared above the surface of the sea, the anterior smaller and lower than the posterior. The posterior hump was estimated to be about one metre high (from the waterline). "Small indentations could also be seen along the rear of the back crest" (Heuvelmans 1968: 525). The length was estimated to have been nearly five metres (Heuvelmans, 1965: 600), about 15 feet (Heuvelmans, 1968: 525). Its colour was black and like a whale's skin.

As mentioned by Heuvelmans the description of the posterior hump reminds one somewhat of the 'Soay Beast' (De 18). This animal may well have been a Leathery Turtle. The feeble denticulation posteriorly on the crest, agrees well with *Dermochelys coriacea*; the notches separated by tubercles are most marked posteriorly in this species.

NORWAY

Ut 3, before 1753, Sundmøer.

Pontoppidan (1753: 300, note; 1754: 348, note; 1755: 185, note), Oudemans (1892: 128, no. 14), Heuvelmans (1965: 74; 1968: 107).

Pontoppidan writes that a not altogether dependable report reached him about some farmers of Sundmøer 'recently' having caught in their nets a 'Worm', three fathoms in length, with four feet under it, and he adds that, therefore, it resembled a crocodile.

I suspect that this animal also was a turtle, the length of which had been greatly exaggerated.

Ut 4, 4.viii.1902, alive, Oslo Fjord.

Heuvelmans (1965: 405, 661, fig. 73; 1968: 359, 581, fig. 83), Brongersma (1968f: 225).

The sea monster was seen by Mr. Hans Davidsen and others from the sailing yacht 'Tonny'. Heuvelmans places this animal with the Pinnipedia and for this species of Sea Serpent (Heuvelmans 1965: 645; 1968: 566) introduced the name *Megalotaria longicollis*. For me it seems more likely that a Leathery Turtle was seen, of which the size has been exaggerated.

GREAT BRITAIN

SCOTLAND

Ut 5, 27.viii.1958, alive, about 10 miles West by North of Handa Island (which is about 10 miles S of Cape Wrath).

Stephen (1961: 44, no. 5): unidentified turtle.

A sight record by Mr. Alex Cowie, while seine-netfishing in his boat "The Seagull". "The animal was about twenty yards away and was quite unlike the numerous seals swimming around. The longer neck and broader expanse of back showing when breaking the surface suggest that it could have been a turtle."

CHANNEL ISLANDS

Ut 6, viii.1923, alive, island of Herm.

Dinsdale (1961: 219-220), Heuvelmans (1965: 462, 663; 1968: 407, 583), Brongersma (1968f: 226).

The sea monster has been described by Mrs. Hilda Bromley, who with her family was staying on the island of Herm. At low tide tracks were found as if something huge had come out of a large pool, and had dragged itself

over the seaweed covered sand. The tracks (5 to 6 feet wide) led to another, larger pool, in which they disappeared. "Then slowly, away in the middle of the pool, a large head appeared and a huge neck — but we did not see the body; there it stayed with its great black eyes gazing at us without fear — then slowly it sank back into the water." The animal had a black skin and a thick neck, 3-4 feet long.

This animal may have been a Leathery Turtle which was caught by the receding tide.

Channel

Ut 7, 13th century (or earlier), Channel.

Thomas of Cantimpré (ca. 1233-1248, lib. VI), Vincent of Beauvais (ca. 1250; ed. 1486?, lib. XVIII, cap. CXXXIX), Jacob van Maerlant (ca. 1266-1269, Boek VI; in: Verwijs, 1878: 341-342), Petrus Berchorius (ca. 1325, lib. IX, cap. CXXXVI; ed. 1731: 291): Zitiron.

Albertus Magnus (ca. 1252, or after 1262, lib. XXVI, no. 138, in: Stadler, 1920: 1549-1550): Zytyron.

When in 1966 I read a paper on the occurrence of turtles in European Atlantic waters, Prof. A. Maartje E. Draak pointed out, that the figure shown of *Dermochelys coriacea* reminded her of the animal, which Jacob van Maerlant qualified as being the 'knight of the sea', and which Van Maerlant and his predecessors named Zitiron. Van Maerlant's account is mainly a rhymed translation of a manuscript, entitled "De Natura Rerum" or "De Naturis Rerum", written by Thomas of Cantimpré (Thomas Cantimpratensis). The same manuscript has also been used by other authors, e.g., by Vincent of Beauvais (Vincentius Bellovacensis), Albertus Magnus, and Petrus Berchorius. I am greatly indebted to Dr. M. I. Gerhardt, Utrecht, for providing me with the text of the relevant passages in the writings of Thomas of Cantimpré and of Petrus Berchorius, as well as for references to the works of Vincent of Beauvais and of Albertus Magnus.

It may be mentioned that Thomas of Cantimpré, Vincent of Beauvais, and Jacob van Maerlant refer to an earlier manuscript, entitled "Liber Rerum", a work that has not yet been traced.

The description by Thomas of Cantimpré, transcribed by Dr. M. I. Gerhardt from manuscript no. 710 in the library of Utrecht University, may be given here:

"De Zitirone"

"Zitiron monstrum est marinum quod vulgus vocat maris militem, sicut dicit liber rerum, et est ingens et fortissimum. Huiusmodi dispositionem habere dicitur: In parte anteriori quasi formam armati militis praefert; et caput quasi casside galeatum ex cute rugosa ac dura et firma nimis. A collo eius dependet scutum longum et latum et magnum; et cavum interius est ut in eo possit monstrum circa ictus pugnantium more

defendi. Vene quedam ac nervi fortissimi de collo eius et de spondilibus protenduntur in humerum, et hiis quidem predictum scutum dependet in scapula. Est autem ipsum scutum forma triangulare, duricia ac firmitate tam validum ut umquam vix possit iaculo penetrari. Brachia habet fortia nimis et loco manus quasi manum bissulcam, cum [qua] validissime percutit, ut frustra temptet homo (posse) ictus sine maximo discrimine sustinere. Unde fit ut difficulter nimis capi possit ab homine; et si captus fuit, difficulter possit etiam necari nisi cum malleis. Huius animalis genus humani generis discordiam imitari videatur, quod utique inter bella se [= inter se bella] commove[n]t, et tantam turbationem maris faciunt in pugnando ut in loco certaminum tempestas quedam exsurgere videatur. In mari brittannico hec monstra habent."

Paraphrasing this description we see that the Zitiron is a very large and very strong animal. In its anterior part it is said to resemble a knight. In shape, the head resembles a helmet; it is covered with a rough, hard, and very tough skin. The Zitiron has a long, broad, and strong carapace, which is triangular in shape; it is so hard and strong that it hardly can be pierced by a spear. The arm is very strong, and the hand is split into two. With its arm the animal can strike hard blows, which can cause serious hurt to man. This makes it very difficult to capture the Zitiron, and once it has been taken, it is difficult to kill the animal, unless one uses a sledge-hammer. Zitirons imitate man in fighting one another, and when doing so they create great commotion in the sea. This monster is found in the English Channel.

The versions given by the various authors agree in the more important points, although they do show some differences in wording. The statement that the Zitiron is found "in mari brittannico" is repeated by Albertus Magnus, and by Petrus Berchorius; in his translation Van Maerlant writes "in dInghelsche zee" (in the English Sea). This statement is not mentioned in a fourteenth century copy of Thomas of Cantimpré's manuscript, nor is it mentioned in a printed version (1486?) of the *Speculum Naturale* by Vincent of Beauvais. The remarks about Zitirons fighting one another are mentioned by Petrus Berchorius, but they do not appear in the versions by Vincent of Beauvais, Jacob van Maerlant, and Albertus Magnus.

Much of the description consists of generalities, which may apply to any turtle, e.g., the presence of a carapace, the animal being able to strike hard blows with its fore flippers, and the difficulty of killing it.

The statement that the hand is split into two does not fit any turtle, unless the author describes a fore flipper of which the distal part has been bent backwards until it lies against the proximal part. In that case the impression is given that the flipper consists of two parts, with a groove between them, but I must admit that this explanation is rather far-fetched. If I seem to make light of this point, this is only due to the fact that I have not been able to think of any other large marine animal that has a split 'hand', and which

fits the rest of the description. Still this description of the 'hand' is the main reason that I list this record here, and not among the specimens that probably were Leathery Turtles.

The remarks about the Zitiron's fights are also difficult to explain. I have no knowledge of Leathery Turtles fighting one another. There may be some competition between males at mating time, but if so, this hardly will have been observed in European Atlantic waters. When being captured a Leathery Turtle may cause great commotion in the sea, and this may have contributed to the story. The appearance of the Zitiron, with "helmet" and "shield", apparently appealed to the imagination of the people, and this made them call it the knight of the sea. It is not impossible that one concluded that an animal of such a warrior-like appearance should behave like a warrior and fight. Another explanation might be that the commotion in the sea was caused by other animals, and that erroneously it was associated with the Zitiron.

However this may be, I am convinced that the description of the Zitiron was based upon a turtle. Albertus Magnus added the remark "est de genere tortucarum" (Stadler, 1921: 1550). When dealing with the writings of Albertus Magnus, Balss (1947: 262) states that the turtles referred to may have been Loggerheads. This may be true for the other references to turtles made by Albertus Magnus, but the general shape of the Zitiron makes it more likely that Thomas of Cantimpré and those who borrowed from him were describing *Dermochelys coriacea*. When the Leathery Turtle is examined in dorsal view (Pl. 1), the shape of the head is indeed like that of the conical helmets used in the middle-ages. More than the carapace of any other turtle, that of the Leathery Turtle, strongly tapering behind as it is, does resemble a knight's shield. Although no definite proof can be given, I believe that Prof. Draak may be right in identifying the Zitiron with *Dermochelys coriacea*.

Stadler (1921: 1652, Zytyron) suggests that the Zitiron may be the Armed Bullhead, *Agonus cataphractus* (L.), but this seems very unlikely. It is hardly possible that one would describe a fish that reaches a length of only eight inches (20 cm) with the words "est ingens et fortissimum", nor is it likely that such a small fish could strike blows as hard as are attributed to the Zitiron.

It may be mentioned that Albertus Magnus (Stadler, 1921: 1521. no. 19, Barchera; 1547, no. 126, Tortuca maris) attributes the vernacular name "miles" also to other turtles (see Un 44).

FRANCE

Ut 8, summer of 1911, alive, Saint-Quay-Portrieux (Côtes du Nord).

Heuvelmans (1965: 401, 662; 1968: 356, 582), Brongersma (1968f: 225).

Of this animal Mr. F. Gélard reported seeing the head and neck, and a sort of black dome or hump, which appeared some distance behind the neck.

Although Heuvelmans (1965: 662; 1968: 582) believes this animal to have been the Pinnipede which he named *Megalotaria longicollis*, it is more likely that it was a Leathery Turtle.

IX. TORTOISE, ERRONEOUSLY RECORDED AS A LEATHERY TURTLE.

"Algemeen Handelsblad", 78th year, no. 24504, 21.vii.1905, 1st sheet; "Het Volk", 6th year, no. 1627, 23.vii.1905, first page of second sheet.

Anonymus (1905).

V. van Laar (in litt., 27.iv.1964).

This case was brought to my attention by Mr. V. van Laar, to whom I am also greatly indebted for all the trouble he took to trace the specimen. Translated into English, the item in the press reads as follows: 'A rare catch. A rare fish was landed yesterday by a fisherman at Uitdam. In one of the eel-traps was found a tortoise, to the memory of fishermen the first to be captured in the Zuyder Sea. It was 30 cm long, nearly black on the back, spotted with yellow ventrally, with a light-coloured ring round the neck. It is planned to send it to Artis'⁹). Anonymus (1905) did not see the specimen, and the only literature available to him apparently was the Dutch popular edition of Brehm (Huizinga, no date, a: 164, note), in which reference is made to the occurrence of the Leathery Turtle on European coasts. This led Anonymus (1905) to assume that the specimen captured near Uitdam was a Leathery Turtle, adding that it might be a very young specimen.

Enquiries showed that nothing about this specimen was known to the Amsterdam Zoological Gardens, nor to the Amsterdam Zoological Museum.

By visiting Uitdam, Mr. Van Laar obtained the following information. The specimen was captured by a Mr. Westerveld, not in the Zuyder-Sea, but in a canal close to Uitdam. Believing it to be some kind of aquatic animal, Mr. Westerveld placed it in a fish-well, under water, intending to keep it alive, and with the intention to take it to the Zoo next day. However, during the night the turtle drowned. The carapace and plastron were separated and cleaned. With the plastron as a basis, the carapace upside down, and a silver pedestal between them, the specimen was turned into an ash-tray, and as such the remains of this specimen were preserved. Mr. Westerveld moved from Uitdam to Holysloot, and after his death, the ash-tray came into the possession of Mr. K. Breedijk, of Holysloot. The drawings made by Mr. Van

⁹) The Dutch text uses the word schildpad, the general term to indicate a tortoise, a terrapin, or a turtle. 'Artis' is the name by which the Zoological Gardens of the Royal Zoological Society 'Natura Artis Magistra', Amsterdam, are known to the general public.

Laar definitely show, that it was not a turtle, but a tortoise. What species of tortoise I cannot say without examining the specimen myself, but in any case this supposed Leathery Turtle can be struck from the list of turtle records.

GENERAL DISCUSSION

In the preceding pages the records for the various species have been enumerated and comments have been made upon them. In the following pages some more general aspects will be discussed.

The fairly regular appearance of turtles in European Atlantic waters raises several questions, such as: 1, from where do they come, and how do they get there; 2, what causes a turtle to leave a region with a suitable climate to go to an area where the climatic circumstances make survival for any length of time and breeding impossible; 3, how long does it take a turtle to complete the trip to Europe; 4, is this journey always one from which no return is possible? Although no definite answer can be given to most of the questions, it is worth while to discuss them, for such a discussion may indicate points to which more attention should be paid in future research.

1. The question about the area of origin of the turtles that are found in European Atlantic waters and how they get there, in fact consists of two questions, but these are so closely connected that they may be discussed together. If the one can be answered it becomes easier to answer the other, and vice versa.

When discussing the records for the Green Turtle (*Chelonia mydas*) it has already been stated that some of these records are based upon specimens that were brought to the area by ship and that they were jettisoned alive or dead. Some authors (e.g., Pennant, 1777, 1789: 47) have suggested that turtles found on our coasts may have escaped from wrecks. Cornish (1874a: 4242) refers to a ship carrying turtles that was lost in Mount's Bay, Cornwall, in the winter of 1871/1872, and from which two live turtles were saved; there is no evidence that other turtles survived and escaped. There is, of course, the story of the turtle lost by Mr. Laborie when in 1741 or 1742 his ship was wrecked on the French coast, but the surmise that this turtle survived and was captured many years later (De 124) is based upon the erroneous assumption that the lost and the captured turtle belonged to the same species.

It must be remembered that the turtles that were shipped to Europe regularly and in great numbers were Green Turtles fated to be used in preparing turtle soup. Of course, the possibility cannot be wholly excluded that once in a while someone, who had no knowledge of the turtle trade, may have shipped a number of Loggerheads to Europe to try and pass them off as edible turtles. Perhaps the turtles mentioned by Chapman (1866) that were

"not worth twopence", or those that were "the wrong sort" for his purpose, were of this kind. The number of Green Turtles found on our coasts is very low, and it represents but a very small fraction of the number of turtles that used to be shipped to Europe. If one would wish to explain the much larger number of records of the other species also by assuming that the specimens were jettisoned from ships, one would also have to assume that truly immense numbers of these turtles have been shipped regularly to Europe, and this certainly has never been the case. To account for the large number of live turtles found in European Atlantic waters one would further have to assume that very many ships carrying turtles had been wrecked.

The majority of the records of turtles that are found in our waters are based upon species that in Europe have no economic importance at all, viz., the Leathery Turtle (*Dermochelys coriacea*), the Loggerhead (*Caretta caretta*), and Kemp's Ridley (*Lepidochelys kempii*). Moreover, one must remember that shipments of live turtles do no longer take place, and that, therefore, the records of turtles found in European Atlantic waters since the second world war cannot be explained by assuming that they were brought there on board of ships anyway.

Thus, we must arrive at the conclusion that the Leathery Turtles, Loggerheads, Kemp's Ridelies, and a few Green Turtles (e.g., Cm 4, Cm 20) did reach European Atlantic waters on their own, unaided by man. With the area of origin of these four species, and with the ways and means by which they came to Europe, the further discussion will be concerned. The occurrence in European Atlantic waters of the Hawksbill has not yet been established with enough certainty to let it play an important part in the argumentation.

As far as the presence of breeding populations and nesting beaches is concerned, the region of the Atlantic Ocean north of the equator (including the seas connected to this ocean) can be roughly divided into three parts: 1, the Western Atlantic (East coast of U.S.A.) together with the Gulf of Mexico and the Caribbean; 2, the Eastern Atlantic (west coast of Africa, northwards to about 35°N in Morocco); 3, the Mediterranean. The question is whether the turtles found in European Atlantic waters do come from only one of these areas, or that they come from two or from all three of them.

Already long ago, Pennant (1774: 266), in his description of the Hebrides (chapter on Islay) wrote: "*American* tortoises, or turtle, have more than once been taken alive on these coasts, tempest-driven from their warm seas." From the context it is clear that Pennant considered these turtles to come from the West Indies, for he mentions them in connection with seeds of trees that grow in Jamaica, and that are often found on the shores of the Hebrides; furthermore he adds: "and part of the mast of the *Tilbury* man

of war, burnt at *Jamaica* was taken up on the Western coast of *Scotland*." Necker (1809: 90; Gumprecht, 1854: 416) writes about the great current that washes the shores of the Antilles, and casts some of their products on the coasts of the Hebrides; among the Antillean products seen by him in the Hebrides, Necker mentions the shells of turtles. Thus, both these authors are of the opinion that the turtles found in Scottish waters came from the West Indies. When a small invasion of Loggerheads and Kemp's Ridleys took place on British coasts in 1938/1939, their origin was discussed, and again the Western Atlantic origin of these turtles was stressed (Deraniyagala, 1938*b*; H. W. Parker, 1939*a*, 1939*b*, 1946). It is true that Deraniyagala (1939*a*, *b*, 1952) at a later stage believed to dispose of evidence that the turtles might come from breeding populations in the Azores, rather than from American Atlantic waters. Deraniyagala's later conclusion is not tenable, however, for turtles do not breed in the Azores (Chevreux & De Guerne, 1888: 628, reprint: 4; Albert I, 1898*a*: 10; 1898*b*: 313; 1905: 263; 1932*a*: 22; 1933*f*: 279; H. W. Parker, 1956: 4; Carr, 1957: 48; 1967*c*, 1968: 124-125). Caldwell, Carr & Ogren (1959: 295) summarized the situation as follows: "It has long been suspected that the stray loggerheads found occasionally in European waters were individuals from American waters, where the nearest upstream nesting grounds lie (in relation to the Gulf Stream). Although it may never be possible to prove the American origin of the European loggerheads, and while it may eventually be shown that they derive from downstream rookeries, on the Mediterranean coasts for example"

Although it cannot be wholly excluded that some of the turtles found in European Atlantic waters do come from the African coast or from the Mediterranean, the evidence for the Western Atlantic as the source of our turtles has become much stronger, since the nesting beaches of *Lepidochelys kempii* have been found. As has been stated already, the only known nesting beaches of Kemp's Ridley are found on the western shores of the Gulf of Mexico, in northern Mexico and southern Texas. All specimens of Kemp's Ridley found on the Atlantic coast of North America and those in European Atlantic waters ultimately must have come from these nesting beaches. In some seasons (e.g., in the winter of 1938-1939) Kemp's Ridleys and Loggerheads arrived more or less together on British coasts, and the obvious assumption is that they all came from the Western Atlantic, although not necessarily from the same nesting beaches.

The Loggerhead (*Caretta caretta*) has a much wider breeding area in the Western Atlantic than has Kemp's Ridley. It breeds in the Caribbean (Carr, Hirth & Ogren, 1966: 2), in the Gulf of Mexico (Carr, 1952: 390; Cald-

well, Carr & Hellier, 1956b: 292; Caldwell, Carr & Ogren, 1959: 298), on the North coast of Cuba (Caldwell, Carr & Hellier, 1956b: 295), on the East coast of U.S.A. from Florida northwards to about 35°N in North Carolina (Carr, 1952: 390; Caldwell, Carr & Ogren, 1959: 298), and in the past even farther northwards to Virginia (Carr, 1952: 390). If we accept that most (if perhaps not all) Loggerheads found in European Atlantic waters come from the Western Atlantic they may have come from any of these nesting areas, e.g., accompanying the Kemp's Ridleys that pass from the Gulf of Mexico through the Florida Straits into the Atlantic Ocean, but it is more probable that they come from the nesting beaches on the Atlantic coast of U.S.A., at a young age moving out into the ocean far away from the coast, and as it were being fed into the current that already harbours some Kemp's Ridleys. If the young Loggerheads would come from the Gulf of Mexico together with the Kemp's Ridleys, moving northwards close to the coast it becomes difficult to understand why the Loggerhead is more rare along the northern part of the American Atlantic coast than Kemp's Ridley, whilst in European waters the opposite is the case. It seems that the majority of Kemp's Ridleys that leave the Gulf of Mexico through the Florida Straits tend to keep closer to the coast, while the juvenile Loggerheads tend to take more to the open ocean, where they may be joined by a few stray Kemp's Ridleys.

Although the Green Turtle (*Chelonia mydas*) has a much wider breeding area than Kemp's Ridley, this area is more restricted than that of the Loggerhead. In the first place the Green Turtle has a more distinct preference for warmer regions than the Loggerhead, and in the second place persistent persecution (especially the indiscriminate harvesting of eggs, and the killing of females on the nesting beaches) has so much reduced the Green Turtle population that some of the nesting beaches near the original border of the distributional area of this species have been left. It may be that an occasional female still may lay eggs in the Bermudas (Mowbray & Caldwell, 1958: 148; Parsons, 1962: 24), there is no true breeding population there anymore. A few nesting beaches remain in the Caribbean and on Little Inagua (Parsons, 1962: map on fly-leaf; Carr, 1965: 81 map). Carr (1967c: map on fly-leaf; 1968, map on pp. (xii)-(xiii)) has shown that Green Turtles from the nesting beaches at Tortuguero (Costa Rica) may wander into the Gulf of Mexico, to the Florida Keys, to the north and south coasts of Cuba, to Panama, to Colombia, and to Venezuela. It is true that these data are based upon the wanderings of adult females, but it is equally certain that also immature specimens do migrate over long distances. Thus, the immature turtles that are taken off the Florida Keys and those taken in the Bermudas

must have come all the way from the Caribbean area. That only very few of them do reach European Atlantic waters is understandable when we consider that the nearest nesting beaches are much farther away than those of the Loggerhead. Moreover, it must be remembered that it is quite well possible that in past centuries, when Green Turtles were more numerous in more northern areas (Florida, Bahamas, Bermudas), more specimens came to Europe. Some of the records from the past century may well have been based upon specimens that got there on their own (e.g., Beltrémieux, 1864: 37; 1884: 471).

The Leathery Turtle (*Dermochelys coriacea*) is known to breed in Florida and in the Caribbean area (Carr, 1952: 450-451; Caldwell, Carr & Hellier, 1956a: 283). It is known that the Leathery Turtle wanders along the Atlantic coast of North America northwards to Newfoundland (Squires, 1954: 68; Bleakney, 1965: 121). It has been tentatively suggested by Bleakney (1965: 124) that, instead of turning back to the Caribbean in the autumn, some of these Leathery Turtles might continue their journey by following the Gulf Stream to Europe.

The Hawksbill (*Eretmochelys imbricata*) breeds (or did breed in the past) in the Gulf of Mexico, the whole Caribbean area, the Bahamas and rarely in Florida (Carr, Hirth & Ogren, 1966: 2). It is rather remarkable that of this species, which lives and breeds in the same general area as the other species, live specimens have not yet been recorded with any certainty from European Atlantic waters.

As yet we have no means to distinguish specimens of the Western Atlantic populations of the Leathery Turtle, Loggerhead, and Green Turtle from specimens of the Eastern Atlantic populations of these species. Thus, the turtles themselves do not offer any positive evidence as to their area of origin. As far as our knowledge (based upon the turtles themselves) goes at present, the occurrence of *Lepidochelys kempii* in European Atlantic waters is the only definite evidence for a Western Atlantic origin of our turtles. We shall have to look for other evidence that may strengthen the conclusion that the turtles come from the Western Atlantic.

When a Loggerhead (Ca 21) with algae growing on its carapace was found in British waters, it was hoped that the algae might provide evidence for the origin of the turtle. Parke & Dickinson (1947: 171-172) identified the algae as being *Ectocarpus mitchellae* Harv. var. *parvus* Taylor. At the time this variety, if not the species, was considered a form from American waters, and it was suggested (Wilson, 1947: 161) that this alga might prove the American origin of the turtle. However, most specialists on algae nowadays consider the European *Giffordia virescens* Thuret to be conspecific

with the American *Giffordia mitchellae* Harv. (as *Ectocarpus mitchellae* is now named), and the var. *parvus* is no longer distinguished as a separate form. With regard to this question, Prof. Randolph Taylor, University of Michigan, wrote to me as follows (8.ii.1966): "Under the circumstances, If *G. virescens* is really identical with *G. mitchellae*, I see no reason why a dwarf form of an European colony could not appear on a turtle in European waters. I should in such a case simply feel that the evidence was indecisive."

Some attention must be paid to the ways and means by which turtles may get to European waters.

Transportation by human agency (i.e., on board of ships) has been discussed above when dealing with the records of Green Turtles. More or less connected to human agency is the hypothesis by De la Font (1731, 1733), who suggested that the Leathery Turtle (De 110) taken in the Loire estuary in 1729, might have come there by following ships that came from the Far East, a solution of the problem that we cannot accept. Various authors have suggested that gales or storms played an important part in bringing turtles to European Atlantic waters. It may be remembered that Pennant (1774: 266) wrote: "tempest-driven from their warm seas". Beltrémieux (1864: 37; 1884: 471) when dealing with the Green Turtle also stated that these were driven to the coast by storms, and Lyell (1868: 366) mentioned storms as the third possibility for turtles being driven to high latitudes. Schmidtlein (1893: 158) mentions wind and weather as one of the factors bringing Leathery Turtles to European waters. H. W. Parker (1939b: 129) suggests that hurricanes in the Caribbean area might be initial to bringing juvenile turtles into the open ocean, with the consequence that they lose their bearings, and that subsequently they may be brought to Europe by the current. Russell (1939: 207) is of the opinion that once turtles have come to an area where westerly winds prevail, these winds will tend to drift the turtles up the English Channel. There is no doubt that persistent winds, gales, and storms will play an important part in bringing turtles to our shores. In various reports upon stranded turtles it is stated that at the time of stranding, or just before, gales or storms were blowing to the coast. If we consider turtles as floating objects, which to a certain extent they are, persistent winds, gales, or storms will greatly affect them, speeding up their journey across the ocean. Although hurricanes may affect their movements in the initial stages of their voyage, I do not consider this the most important factor of starting them on their trip.

As another factor that might be of importance to bring turtles to European Atlantic waters, Lyell (1868: 366) mentions an abundant supply of food during uncommonly warm seasons. It is not clear whether Lyell considers

the uncommonly warm seasons the primary cause for the abundance of food, or whether he means to say that uncommonly warm seasons make it possible for the turtles to reach the food supplies in higher latitudes. It may be remembered that H. W. Parker (1951: 134-135) suggested that the Loggerheads might feed on the predatory fish, which in their turn feed on the immense numbers of eel larvae that move from the Sargasso Sea to the coasts of Western Europe. A turtle having found such an abundant supply of food would be tempted to remain with this supply, and might follow it beyond the point of no return. The statement by Pouchet & de Guerne (1886: 878; 1940: 242) that Loggerheads in the Azores region do feed upon fish may give some support to H. W. Parker's hypothesis, but as I have mentioned above (p. 000) I am somewhat doubtful about these turtles being able to catch healthy, fast swimming fishes. Moreover, one would sooner believe that the shoals of eel larvae in themselves would form an ample supply of food to the turtles, as the slow-moving larvae will form a much easier prey. The hypothesis explains only part of the voyage that the turtles have to make to get to Europe. One would yet have to explain how the turtles do travel from the nesting beaches to the breeding area of the eel larvae (22° - 30° N, 48° - 65° W; Bertin, 1956: 120), or rather to the area where the larvae have ascended to close to the surface. It takes the eel larvae about two and a half years to reach the European coasts (Bertin, 1956: 127), and although some turtles may have spent this time, or even more, at sea (e.g., the adult Loggerheads that occasionally come to our waters), there are indications that most turtles make a speedier crossing. This, one could explain by assuming that the Loggerheads do actively swim in the direction of Europe, overtaking the various age classes of eel larvae. If turtles moving away from the American coastal waters would be tempted seriously to follow shoals of eel larvae, one may well ask whether they would not meet first with the larvae proceeding to the American coast and would follow these, rather than travelling much farther to pick up the flow of larvae going to Europe.

Still, food will play a part in the movements of turtles on their way to Europe, and it is very likely that turtles will concentrate in areas where an abundance of food (Scyphomedusae, *Physalia*, *Velella*, Salpae) are to be found, and that the turtles will follow these planctonic organisms when they are moved towards European shores by the current and/or by persistent favourable winds.

The remark about uncommonly warm seasons by Lyell (1868: 366) suggests a rise in the temperature of the sea during these seasons making the conditions of life more suitable to turtles. Russell (1939: 206-207) wrote as follows: "While there is no indication that the water temperature in the

Channel region is any higher than normal, there can be no doubt that warm water has been penetrating further towards the Arctic regions. This will allow an extension of the northern boundary of certain animals, and it is perhaps natural to suppose that, following this extension, the centres of distribution may also have shifted more to the north. Such an extension might thus bring turtles into a region in which westerly winds would tend to drift them up the English Channel, without necessarily a passage of any considerable body of water in the same direction." This explanation of the presence of turtles in British waters places the northward extension of warmer water primarily, thus enlarging the area in which turtles can live, and secondarily the prevailing winds will bring them to the British coasts.

In recent years data have been published about a periodical (or rather episodic) warming up of the sea in more northern latitudes (e.g., Beverton & Lee, 1965: 79-85, figs. 1-2). A very slight rise in the temperature of the surface water (even if it is less than one degree centigrade) may make all the difference to a turtle, making it possible to reach more northern waters and to survive in higher latitudes for some time. It is well possible that such a small rise in temperature contributed to Leathery Turtles (De 2-10) reaching Norway, and to a juvenile Loggerhead (Ca 1) reaching Murmansk. It will be worth while to make a closer study of the movements of turtles in relation to the temperature of the surface water.

When discussing the possible Western Atlantic origin of the turtles found in European Atlantic waters, several times reference has been made to these turtles having been brought there by the current. When one takes a look at a chart showing the trend of the currents in the North Atlantic Ocean it becomes apparent that the direction of the currents is very favourable to bring floating objects from the West Indies, from the Gulf of Mexico, and from the Atlantic coast of North America. The ramifications of the Gulf Stream fan out towards the North of Europe (along the West coasts of Ireland and Scotland to Norway, and around the North Cape into the Barentsz Sea), to the British Isles, to the Bay of Biscay, and to the Azores. A branch turns southwards around Shetland, continuing along the East coast of Scotland and England, to turn eastwards and eventually northwards again along the Dutch coast; another branch passes through the English Channel and through the Straits of Dover to enter into the Southern North Sea. Along the West coasts of Spain and Portugal the current goes southwards, and it continues in this direction along the African coast. The Gulf Stream is not the "river" of warmer water with a fixed course, flowing steadily from the Caribbean region to Europe, as popular belief sometimes has it. The situation is definitely more complex than can be shown in a generalized chart. It may

vary its course, it may meander and form eddies along its route, and it varies in strength. Nevertheless, the general trend is towards Europe, and it is worth while to consider to what extent it acts as a transporting medium to bring floating objects from the Caribbean, the Gulf of Mexico and North American Atlantic waters to European shores.

Since the 17th century already it has been reported that seeds are brought by the current from the West Indies to European coasts. This phenomenon has been discussed at some length by Guppy (1917: 20-45), who also reviewed the previous literature on this subject. Ridley (1930: 243) also refers to this transportation of seeds to European coasts. There are also reports on logs of mahogany being brought to Europe by the Gulf Stream (e.g., by Necker, 1809: 90; Guppy, 1917: 40). Pennant (1774: 266) stated that the mast of the "Tilbury", a man-of-war burned at Jamaica, was found on the West coast of Scotland. Although Guppy reviews the literature on this subject I may also refer to an earlier survey by Gumprecht (1845). Furthermore, there is the evidence of drift bottles, upon which so much of our knowledge of the current system is based. Again I may refer to Guppy's (1917: 52, 53, 65-68) discussion of the matter. Of special interest are the data given by him in the table on p. 52; in column A of this table ten drift bottles are mentioned that were thrown overboard in the region between Florida, Cuba, and the Bahamas (21° - 27° N), and these were recovered as follows: Orkney, 1; Scotland and the Hebrides, 1; Ireland, 3; England, 2; France, 2; Azores, 1. In column B of his table Guppy mentions thirty-eight drift bottles launched in the vicinity of Cape Hatteras (34° - 36° N) and these were recovered as follows: Norway, 1; Sweden, 1; Shetland, 1; Orkney, 1; Scotland and the Hebrides, 6; Ireland, 7; England, 1; France, 8; Azores, 9; Morocco, 1; West Indies, 2 (these last two apparently turned southwards with the Canary Current and were brought to the West Indies by the North Equatorial Current). Finally, we may take into account the movement of derelicts (Krümmel, 1911: 580 fig. 169, 588; Hautreux, 1910), e.g., the track followed by the schooner "W. L. White", which on March 13th, 1888, was abandoned off Baltimore, and which stranded in the Hebrides on January 23rd, 1889. It is true that in the first part of its drift, when the masts were still standing, its movements will have been governed more by the wind than by the current; but when the masts had disappeared and the deck was awash, the current must have been the main agency to bring it to the Hebrides. A further point of interest is that derelicts do not follow a straight course, but that from time to time they may drift around in larger or smaller loops (Krümmel, 1911: fig. 169); of the total distance of

5200 nautical miles covered by the "W. L. White", about 2000 nautical miles come on the account of such detours.

The evidence of inanimate objects (like seeds, drift bottles, and derelicts) from the Western Atlantic reaching European shores can only be accounted for by accepting that they have been carried there by the currents, and have been helped along by the wind. However, it is another matter whether the agencies that bring inanimate objects to our shores are also responsible for the transportation of animate objects like live turtles. After all, a turtle can swim and it can move about freely at sea. Still, it is a fact of common knowledge that the current has an influence on ships that move under their own power, speeding up the voyage when going with the current, slowing down when moving against the current, and when passing across a current this will cause the ship to drift to some extent from its course. The same will apply also to a swimming turtle.

Sometimes a turtle will behave as an inanimate object. Various authors (e.g., Carr, 1952: 388) state that in the open sea Loggerheads often spend a great deal of time floating on the surface of the sea, presumably sleeping. In the area north of the Azores I have observed numerous Loggerheads floating at the surface. These observations were made in daytime when the plankton was at a depth of about 300 m, and it may be that in the evening when the plankton moves up to the surface the turtles may become more active, feeding on the largest of the plankton organisms. When floating on the surface, turtles will be carried along by the current and they will be pushed along by the wind.

We know that adult turtles travel over great distances to migrate from the feeding areas to the nesting beaches, and vice versa. The most striking example is perhaps the migration of Green Turtles from the coastal waters of Brazil to the island of Ascension and back again (Carr, 1964: 49-50, fig. 1; 1965: 83-84, chart on p. 84; 1967*b*: 882, upper figure on p. 883; 1967*c*: 165-166, chart on fly-leaf; 1968: 165-166, chart on pp. (xiv)-(xv)). This shows not only that turtles do cover great distances in the open ocean, but also that they can do so while travelling against a fairly strong current. However, this applies to the adults. The hatchlings will move with the current towards the Brazilian coast, and it seems unlikely that hatchlings and very young turtles will have the strength to overcome an adverse current. One of the yet unsolved problems is how turtles do orientate themselves when in the open ocean. It has become clear (Ehrenfeld & Koch, 1967: 827) that, bi-coordinate star navigation is not possible for turtles. Without any fixed points of orientation a turtle will not be able to notice the current and it will not be aware of being displaced by it. It is very likely that a juvenile turtle

(or even an adult, outside the breeding season), not having a strong urge to proceed to the nesting beaches and for some reason whatever having lost its bearing, will swim about at random. If so the movements in opposite directions will neutralize one another, and the resultant of the movements of the turtle itself will be zero. Adding to this the influence of the current and of prevailing westerly winds will cause the turtle to drift in the direction of European Atlantic waters.

As has been pointed out by H. W. Parker (1939b: 128) turtles will spend much of their time on, or close to, the surface, and if they cannot notice the current, they will anyway notice the wind and the movement of the waves. A following sea will assist a turtle in moving forwards, a head-sea will retard it. In the region of prevailing westerly winds the waves will produce an easterly resultant movement, even if the turtle swims at random. Moreover, it is more than likely that a turtle will rather swim with the seas than be buffeted by the waves in trying to swim against them (H. W. Parker, 1939b: 129). In this way the swimming of the turtle will contribute to bringing it to Europe and to shortening the duration of its voyage across the ocean.

In a few instances it is clear that the current, the wind, and the action of the waves are the only factors in bringing turtles to our waters, at least during the last stages of the crossing. This is shown by those turtles that are handicapped in their swimming. It is true that Travis (1959: 168) mentions a female Green Turtle, which having lost one fore flipper and the two hind flippers, still could swim on a straight course, using the remaining fore flipper and crossing her neck far to one side to offset the uneven thrust. In other instances the loss of one flipper proves to be a serious handicap. Ca 32 had lost its right fore flipper and when placed in an aquarium it could only swim in circles; this circular movement will not have contributed much to its crossing the ocean. Ue 8 had four or five barnacles at the tip of each flipper, and this must have been a serious handicap in swimming (E. Harris, in a letter of December 13th, 1959, addressed to the British Herpetological Society). A juvenile turtle found on the island of Jersey (Ca 39) had such a heavy bunch of goose barnacles attached to its carapace that it could float only upside down.

Briefly summarizing the evidence discussed above we see that there is no evidence prohibitive to the assumption that turtles found in European Atlantic waters have come from the Western Atlantic area, and that in fact one species, *Lepidochelys kempii*, can only have come from there. The ways and means by which turtles cross the ocean are complex. It would be wrong to assume that any single factor alone is responsible for bringing turtles to

Europe. The more important factors that cause the actual transportation are the current and the wind; the swimming of the turtle itself and the action of the waves may contribute to some extent. A rise in temperature of the surface water in higher latitudes will enlarge the area where turtles can stay alive, and this will make it possible for turtles to penetrate farther to the north. The presence of large masses of planktonic organisms (Scyphomedusae, *Physalia*, *Velella*, Salpae, etc.) will provide food for the turtles and this will make it possible for them to survive in the open ocean. When these planktonic organisms are driven northwards and north-eastwards by the wind, the turtles may move along with them.

Thus, I arrive at the same conclusion as was reached by previous authors that a source from which turtles come to European Atlantic waters is to be found in the Western Atlantic (including the Gulf of Mexico and the Caribbean). This does not necessarily imply that the Western Atlantic is the only source (except, of course, for *L. kempii*), and it is necessary to discuss the possibility of turtles coming to us from the Mediterranean Sea, from the Atlantic coast of Morocco, or from the Azores.

From the distribution of the records from the northern area over the months of the year it appears that the peak for *Dermochelys coriacea* is found about three months earlier than the peaks of *Caretta caretta* and *Lepidochelys kempii*. The question may be asked whether this proves that the Leathery Turtle arrives in the area before the other species, and whether this might indicate an origin from another area. As far as swimming is concerned, the adult or nearly adult Leathery Turtles will be more powerful swimmers than the young and halfgrown Loggerheads and Kemp's Ridleys, and this may help to speed up the Leathery Turtle's voyage. However, the difference in time for the peaks of *D. coriacea* and *C. caretta* may also be explained in a different way. The majority of records of Leathery Turtles are based upon specimens sighted (and sometimes captured afterwards) at sea. It is clear that a large turtle like *D. coriacea* will be more easily spotted at sea than the small Loggerheads and Kemp's Ridleys, even if all three were present at the same time. The presence of the smaller turtles becomes only apparent when they are washed ashore by gales or storms, and/or when they become more or less benumbed by the cold in autumn and winter. The Leathery Turtles have disappeared from the area by that time, and being much stronger they may be able to stay away from the coasts, when the weaker, smaller turtles are driven ashore. It is not yet clear at what time *C. caretta* comes to European waters; specimens are found almost the year round; the only month in which the species has not yet been recorded in the northern area being June. Do the Loggerheads begin to arrive in July and

stay in the area until May next year, or do they arrive at different times, as the small additional peaks (fig. 41) might indicate? This question cannot be answered without more observations at sea having been made.

Caretta caretta and *Lepidochelys kempii* resemble each other in the fact that the highest number of records is found in December. The two species differ in *C. caretta* having been recorded in all months but June, whilst *L. kempii* is only found in the period October to February (fig. 41). Although both species may be found in the same year and in the same period (e.g., winter 1938-1939, xii.1954, i.1960), there are also years in which only the Loggerhead is recorded, and others in which only Kemp's Ridley is observed. Various explanations may be given for these differences in occurrence.

If in a certain year and in the same month a number of Loggerheads and Kemp's Ridleys are started on their way to European Atlantic waters, Loggerheads coming from the Atlantic coast of North America will have a shorter distance to travel than the Kemp's Ridleys coming from the Gulf of Mexico. In such circumstances the Loggerheads will arrive earlier in European Atlantic waters than the Kemp's Ridleys. This would explain the records of Loggerheads in July, August, and September. When Loggerheads and Kemp's Ridleys arrive at about the same time, one possibility is that the Loggerheads started later in the season and joined the Kemp's Ridleys when these had already been on their way for some time. Another possibility is that the Loggerheads started at the same time as the Kemp's Ridleys, but that some of them lingered on the way to continue the final part of their journey together with the Kemp's Ridleys that were overtaking them. The Loggerheads found in April and May might be very hardy individuals that survived the winter in the northern area, but it seems unlikely that any turtle will be able to survive the low temperatures in the coldest months of the year. Two other explanations may be suggested. Either the Loggerheads wintered in more southern latitudes (e.g., in the region of the Azores), or they may have come from another part of the Atlantic Ocean (including the Mediterranean). If Loggerheads pass the winter in the open ocean in more southern latitudes, it is remarkable that Kemp's Ridley would not do this; if they did winter together, they would arrive and occur in the same months. Different peaks in the occurrence of Loggerheads, and Loggerheads arriving before Kemp's Ridleys, might also be explained by the suggestion that the Loggerheads come to us from different parts of the Atlantic Ocean, some of which are at a shorter distance from the northern area than the nesting beaches in the Western Atlantic. If this would be the case some Loggerheads might come from the Mediterranean, from the Atlantic coast of Morocco, or from the Azores, and these possibilities must be discussed.

1. Mediterranean. The remark by Pennant (1769: 1), when describing the "Spinous Tortoise" (i.e., the Leathery Turtle), that this species was only found in the Mediterranean and in the southern seas of Great Britain, and his further remark (1769: 321) that the turtle taken at Scarborough (Un 40) being a Mediterranean turtle, show that at the time it was assumed that turtles did come from the Mediterranean to British waters. The belief that the Mediterranean is the source for turtles has persisted for a long time. When writing about a Leathery Turtle from California, the Los Angeles Herald of August 25th, 1901 (fide Pritchard, 1971: 32) said "it must have come from the Mediterranean."

Dermochelys coriacea, *Caretta caretta*, and *Chelonia mydas* do breed in the Mediterranean, and as Dr. Julio Rodriguez-Roda, Cadiz, informed me (in litt., 1.ii.1968) turtles do pass through the Straits of Gibraltar regularly and in both directions. In September turtles are common on the Atlantic coast of Spain to the west of the Straits of Gibraltar (and in this instance Loggerheads will be meant); on the Mediterranean side of the Straits turtles are caught in the months of July, August, and September. A turtle leaving the Mediterranean has to move against the current, and once in the Atlantic Ocean the turtle will have to travel against the current to get to the central and northern areas. Adult or half-grown turtles will not have serious difficulties in proceeding against the current. As the majority of the Loggerheads found in the central and northern areas are juveniles, it would be of interest to know whether very young specimens would succeed in overcoming an adverse current. Perhaps, if young turtles keep very close to the coast, they might profit from the counter currents that may result from eddies caused by the West to East current when passing small bays. Besides, if turtles from the Mediterranean would come to the central and northern areas, these would form only a fraction of the number of turtles that passed from the Mediterranean to the Atlantic, or, in other words for every turtle that travels from the Mediterranean to Britain many more will have had to pass westwards through the Straits of Gibraltar. Although turtles (i.e., Loggerheads) are common on the Spanish Atlantic South coast, there is no indication at all that immense numbers of turtles go from the Mediterranean to the Atlantic Ocean. The possibility cannot be excluded that occasionally a Loggerhead from the Mediterranean may come to the central and northern area, but it is not believed that this source can be credited to supply a large part of our turtles.

2. Morocco. To travel from the Atlantic coast of Morocco to the central and northern areas will be even more difficult. The Loggerhead is known to breed on the Atlantic coast of Morocco (Pasteur & Bons, 1960: 27) up

to about 35°N . Only in one or two months of the year (cf. Pilot Charts of the North Atlantic Ocean, March 1969, July 1970) the turtles would find a current passing northwards along or at some distance from the coast towards the Straits of Gibraltar. If they profit of this current they will still have to cross the current passing from the Atlantic Ocean into the Mediterranean, and after that they will have to move against the southward current along the coasts of Portugal and Spain. If, however, from the nesting beaches in Morocco, the young turtles would succeed in moving westwards or West by North, across the southbound current, they might succeed perhaps in reaching the Azores region. There they might proceed northwards to pick up a favourable current to bring them to European Atlantic waters. It is considered extremely doubtful whether the hatchlings will have the force to swim across the current, without being drifted far to the South.

3. Azores. Turtles do not breed in the Azores (references on p. 227). If turtles would come to European Atlantic waters from the Azores, originally they must have come from elsewhere (e.g., from the Western Atlantic, or from Morocco). From the general current pattern it would hardly seem possible that a turtle could find a favourable current close to the Azores to bring it to European Atlantic waters. However, there are data on floating objects that prove such a movement to be possible, e.g., the drifting of the schooner "William Thomas Moore", which derelict was sighted about sixty miles west of the Azores, and which from there drifted northwards to $48^{\circ}35'\text{N}$, $35^{\circ}50'\text{W}$ (Levin, 1927: 220, fig. 2). A drift bottle launched in $40^{\circ}00'\text{N}$, $23^{\circ}00'\text{W}$ drifted to the north coast of Brittany, where it came ashore in $48^{\circ}33'\text{N}$, $2^{\circ}45'\text{W}$ (Pilot Chart, North Atlantic, August 1898: no. 83). Another drift bottle started its voyage in $40^{\circ}55'\text{N}$, $29^{\circ}45'\text{W}$, to be washed ashore on the north coast of Spain in $43^{\circ}50'\text{N}$, $6^{\circ}16'\text{W}$ (l.c.: no. 24). Therefore, it must be considered possible that occasionally a turtle from the Azores region will come to the central and perhaps also to the northern area, but it seems that this will take place under exceptional circumstances only, and that for the present at least one cannot accept the Azores as a major source for our turtles.

After surveying the various possible sources from which turtles might come to European Atlantic waters, the Western Atlantic Ocean is the only one that fits the picture, although the possibility cannot be excluded that occasionally a specimen may come to us from the Mediterranean, or from the Western Atlantic via the Azores; that turtles from the Moroccan Atlantic coast will come to us seems less likely.

2. What causes turtles to leave warmer regions to go to northern regions

with an inclement climate, where they cannot breed and where they cannot survive for a length of time, is not definitely known.

H. W. Parker (1939a: 129) suggested that hurricanes in the Caribbean might be responsible for juvenile turtles being driven from their normal haunts into the open ocean and, in consequence of this, losing their bearings. Having lost their orientation the turtles will have no urge to try and return to the area from whence they had come. It is certainly possible that turtles will have been forced into the open ocean in this way, but as will be discussed below I believe that wandering far into the open ocean is a normal part of the life of at least Loggerheads and Leathery Turtles.

Brehm (1878: 88) mentions "Wandertrieb" (the urge to wander) as a possible factor contributing to the bringing of Leathery Turtles to the Atlantic coasts of Europe.

It is an established fact that at breeding time turtles travel over great distances to go to nesting beaches. This migration is especially marked when the turtles are more or less concentrated in limited feeding areas, from which most of them disappear at a certain time to turn up at a limited stretch of beach to nest (e.g., the breeding migration of the Green Turtle from the Mosquito Cays off the Nicaraguan coast to the rookery at Tortuguero in Costa Rica; Carr & Ogren, 1960). We know also that after leaving the Tortuguero beach some adult female Green Turtles may travel far beyond the nearest sea-grass pastures (Carr & Ogren, 1960: 12, pl. 1; Parsons, 1962, chart on back fly-leaf; Carr, 1965: chart on p. 82; 1967a: fig. on p. 33; 1967c: fly-leaf; 1968: chart on pp. (xii)-(xiii)). It is not known whether these turtles that travelled so far were returning to the feeding grounds from which they had come to breed at Tortuguero, or whether they were driven by an innate urge to wander about more or less aimlessly.

Of two species (*D. coriacea*, *C. caretta*) it is known that they go far out into the ocean. With regard to the Leathery Turtle in the Atlantic Ocean Carr (1952: 448) wrote: "confirmedly pelagic and built to cruise the warm seas unhindered", and when dealing with the Leathery Turtle in the Pacific Ocean: "The Pacific leatherback is pelagic. It is a swimmer of great speed and endurance, and its individual wanderings may actually contribute towards a breaking down of distance barriers". General statements about the Loggerhead being found in the open ocean have been made more than once, e.g., by Holbrook (1842: 37), who wrote: "It is a strong swimmer, and is frequently seen in the midst of the ocean, floating on the surface of the water, motionless, and apparently asleep." However interesting such general statements are, by their having been repeated in literature over and again, it is sometimes believed that it is unnecessary to place the actual sightings on

record. It has also been said that the records of turtles observed at sea give more of a picture of shipping lanes than of the distribution of the turtles. In a way this is true, but the important fact is that the reports show that turtles do occur in the open ocean, and that in some areas they are observed regularly and in fairly great numbers. Besides, there have been and there are still ships that do not keep to shipping lanes. At the end of last century and in the beginning of the present century Prince Albert I of Monaco contributed largely to the knowledge of animal life in the Atlantic Ocean by the many scientific cruises of his yachts. Recently H. Neth. M.S. "Snellius" supplied interesting data when crossing the North Atlantic Ocean on a straight East-West course, and vice versa, at various latitudes. A drawback of some sight records is, of course, that often the turtles have not been identified as to species, but experience shows that a careful observer can do much to give some idea as to which species of turtle has been observed. As the Leathery Turtle is considered to be a species that roams the ocean, it is remarkable that there are hardly any sight records from the open ocean. The only record I have of a specimen sighted far out at sea in the Western Atlantic is that of a specimen sighted by "Snellius" between North America and Bermuda.

All three species (*D. coriacea*, *C. caretta*, *L. kempü*) have been found on the American Atlantic coast as far north as Nova Scotia, and *D. coriacea* has also been reported from Newfoundland. Most records were made close inshore to the west of the Gulf Stream. More records about turtles observed somewhat farther out to sea will be published in the near future (Dr. L. Ogren, in litt., 3.iii.1967). A few records show turtles occurring in the Gulf Stream area.

An interesting feature is the great number of records of Loggerheads in the Azores region. This is due to the thorough exploration of the area by Prince Albert I of Monaco. Recently H. Neth. M.S. "Snellius", N.R.P. "Corte Real" and N.R.P. "Diogo Cão" added numerous records.

That turtles are common in the Azores area is known for a long time. Van Linschoten (1595: 22; 1939: 4) in his sailing directions wrote: "when you pass from 36° to 39¹/₃ degrees you will come to see the island of Flores with some turtles floating in the water", and in the margin he states: "on 36 and 39¹/₃ degrees one sees the island of Flores with many turtles". Drouët (1861: 129) also mentions that turtles are not rare in the area and that they provide good food to the inhabitants and to passing ships; the fact that the turtles were used as food apparently led him to believe that they were Green Turtles. Prince Albert I of Monaco and several of his collaborators commented upon Loggerheads being common in the Azores (e.g., Rouch, 1886: 461; 1940: 228; Chevreux & de Guerne, 1888: 625;

Albert I, 1898a: 10; 1905: 263; 1932b: 279; Richard, 1900: 110; Gain, 1914: 12; 1940: 264). Sir Alister Hardy (1959, 1964: 261) mentions seeing many turtles about 250-300 miles north of the Azores, about ten every hour on the "Discovery II" during the afternoon after the ship had left the Azores.

Of 55 specimens taken during the cruises of Prince Albert I the weight was ascertained; the smallest weighed only 680 gr. (about 1 lb. 8 ozs.) and the largest 35 kg (ca. 77 lb.). Comparing these weights to those for five adult females given by Baldwin & Lofton (in: Caldwell, 1959a: 321), which varied from 193 to 298 lb. (87.5-135.2 kg), it is clear that the 55 Azores specimens were young or half-grown. Still, the reports on turtles by "Snellius" show that adult specimens also occur in the area, turtles up to one metre in length having been observed.

Turtles are also found in numbers in the Madeira area. Tuckey (1818: 9) mentioned seeing many turtles asleep on the surface of the sea when approaching Madeira. Sarmiento (1948: 25, *Thelassochelys caretta*) states that Loggerheads, taken in the neighbourhood of Madeira, are often seen in the market. H. Neth. M.S. "Snellius" added some more records of Loggerheads from the area (Brongersma, 1968c: 130).

From the reports on the observations made during the scientific cruises of Prince Albert I it is clear that the Azores region is rich in planktonic organisms, many of which are of the kinds taken as food by the Loggerheads. Similar evidence is mentioned by Murray & Hjort (1912), and observations by "Snellius" also show that there is an abundance of food for turtles. The rich supply of food probably is the reason for the turtles concentrating in the area. Like the Green Turtle migrates from the nesting beaches to sea-grass pastures far away, many Loggerheads seem to migrate from coastal areas into the open ocean where they find an abundance of planktonic organisms upon which they can feed.

The question again arises as to the area from which these turtles do come. Prince Albert I (1898a: 10; 1932c: 279) was of the opinion that the turtles came to the Azores from the West Indies, transported by the Gulf Stream. The only definite evidence is again a record of *L. kempii* from the island of Corvo, in the Azores. This juvenile must have come from the Gulf of Mexico, where the only known nesting beaches of this species are found. The other arguments that have been used when discussing the area of origin of the turtles found in European Atlantic waters can also be applied to explain the presence of turtles in the Azores region. West Indian seeds, and drift bottles are carried from the Western Atlantic to the Azores (Guppy, 1917: 52-53), and, thus, the currents are favourable to bring turtles to these islands. However, there is one important difference. Whilst turtles do not breed on

the Atlantic coasts of Europe, they do so on the Atlantic coast of Africa. The distance from the nearest nesting beaches of the Loggerhead on the African coast (Morocco; Pasteur & Bons, 1960: 27) to the Azores is much shorter than that from the Azores to any of the American nesting sites. Therefore, one may well ask whether the turtles observed in the Azores region do not come from the African coast, rather than from the more distant nesting beaches in America. As far as juveniles are concerned it is rather unlikely that they will move from Morocco to the Azores. To reach this area they would have to cross the current, and even they would have to go slightly obliquely against it, and it seems hardly possible that juveniles would succeed in doing this. Probably they would be displaced to the south and south-west by the current, and in this way they would not come to the Azores. The possibility cannot be excluded that adult Loggerheads from the Moroccan nesting beaches move westwards to the Azores and Madeira areas. This problem can only be solved by further research, and by tagging adults on the African nesting beaches and by tagging half-grown and adult specimens in the Azores and Madeira area. A first attempt was made by Prince Albert I of Monaco, who about July 11th, 1894, released off Rabat (Morocco) a small Loggerhead that had been taken a month earlier in the Mediterranean ($38^{\circ}51'N$, $3^{\circ}07'15''E$, 11.vi.1894; Richard, 1934: 271); six turtles (of 3, 3, 4, 4, 6, and 6 kg respectively) were released on August 19th, 1897, in $41^{\circ}6'N$, $27^{\circ}50'W$ (Richard, 1934: 288), and one turtle taken on August 10th, 1904, in $30^{\circ}01'N$, $17^{\circ}24'W$ was released on September 12th, 1904, in $21^{\circ}45'N$, $37^{\circ}20'W$. These turtles were tagged with a disk of copper, bearing the name of the yacht, its position and the date of release. As far as I know none of these turtles has been recovered.

If turtles do travel from the American beaches to the Azores and to Europe, one would hope for sight records along the route the turtles must have taken. However, such records are fairly scarce. In chart 5 part of the Atlantic Ocean is shown, in which the sightings of turtles have been indicated. In some instances one dot may represent more than one turtle (i.e., when some turtles were sighted close together). The large numbers of records to the north of the Azores, around the Azores, and in the Azores-Madeira area are due to the following factors: 1°, food is abundant and turtles concentrate in the area; 2°, thorough exploration; 3°, the numbers of records represent the result of observations made during a fairly large number of years. When moving across the open ocean, through areas where food may be scarce, the turtles will spread out over greater distance, and the chances that they will be sighted are smaller by far. Except for the ten degree square between 30° and $40^{\circ}N$, 50° and $60^{\circ}W$ (where no records were

obtained as yet) turtles have been found in the currents flowing to Europe and to the Azores, and these records are highly suggestive of turtles moving towards European Atlantic waters from the Western Atlantic. In a future paper the exact data on the positions of these open ocean records will be given.

3. The time it will take a turtle to cross the Atlantic from American waters to the European Atlantic coasts has been discussed by H. W. Parker (1939*b*: 128-129). Combining part of the track of the derelict "Fannie Wolston" and part of that of the derelict "W. L. White" (Krümmel, 1911: 580 fig. 169, 588), H. W. Parker arrived at the conclusion that the journey from a position just north of the Bahamas to the British coast would take approximately seventeen and a half months. Taking into account the probable preference of the turtle to move with the seas instead of against them the time spent on the journey would be probably thirteen to fourteen months (H. W. Parker, 1939*b*: 129). Guppy (1917: 66) mentions nine drift bottles, which launched between 21° and 27° N in the Florida Sea and neighbouring West Indian region, reached Europe in an average of 435 days (about 14 months 9 days). Ir. L. Otto of the Royal Netherlands Meteorological Office informs me that the shortest time in which a floating object could reach the Land's End area in England from the Florida Straits would be 300 days, but this only under especially favourable circumstances. In this connection I may mention a bottle, which was cast overboard in 28°41'N, 50°47'W on December 23rd, 1957 by Mr. Norton, at the time eighth engineer of S.S. "Ceramic"; this bottle was found on the shore of Hove, Sussex, on October 2nd, 1958 by Mr. W. Dodd. This bottle completed the journey in 385 days, which is remarkably quick, considering that from the position in which it was launched it had to make a detour to the west to get into the current flowing to Europe.

When discussing the age of the Loggerheads found in European Atlantic waters, I arrived at the conclusion that the youngest (Ca 5) must have been about thirteen months old.

From these various data it follows that a turtle's transatlantic voyage to Europe may take at least ten months, more usually probably about thirteen months. However, some of the turtles may spend some time on the way, especially when they come to an area that is rich in food and then the duration of their crossing may be lengthened to two years or more. Prince Albert I of Monaco (1898*a*: 11; 1932*b*: 280) was of the opinion that it would take a turtle about a year to reach the Azores from American waters.

The smallest Loggerhead taken in the Azores region (Station 841, 37°58'N, 25°21'45"W, 23.vii.1897) by Prince Albert I of Monaco weighed 680 g (Albert I, 1898*a*: 10; 1898*b*: 313, 1932*a*: 22; 1932*c*: 280; Richard, 1900: 110; 1910: 153). The Prince estimated the age of this turtle to have been

about a year, i.e., the time the Loggerhead would have needed, in his opinion, to travel from the Antilles to the Azores. However, it is extremely difficult to estimate the age from the weight, because there may be great differences in weight between individuals of the same age (cf. table 14), and if the turtle has been fasting for a long time this may give a considerable reduction of weight (Fandard & Ranc, 1912: 438; 1913: 741; 1940a: 237; 1940b: 238; 13 per cent after eighteen days of fasting). Although by comparison with Sachsse's specimens (table 14) this Loggerhead may have been about ten months old, this does not necessarily imply that the journey took ten months. The juvenile *Lepidochelys kempii* from Corvo, Azores (see p. 175) may have been just under four months of age, and thus the crossing from the Gulf of Mexico to the Azores would have to be completed in that time.

4. Voyage with no return? It is often assumed that the voyage of turtles to European Atlantic waters is one of which no return is possible, and that the turtles found in our waters are strays that have lost their way. But, so long as we do not know how turtles orientate themselves when out in the open ocean, it is difficult to say whether (and how) they might lose their bearings. I believe that wandering about along coasts and out into the open ocean is a normal habit of at least those species that take animal food. There is no doubt in my opinion, that it belongs to the normal pattern of life of the Loggerhead to pass into the open ocean at a very early age. The problem of the so-called 'lost year' may be closely linked with the wanderings of turtles. Dealing with *D. coriacea* in Ceylonese waters, Deraniyagala (1939c: 102) states that the hatchlings move out to more open and deeper water. Recently I placed on record a juvenile *D. coriacea* that had been taken in the Eastern Pacific between 200 and 250 miles SW of Acapulco, Mexico (Brongersma, 1970a: 70; 1970b: 330).

Caldwell, Carr & Ogren (1959: 297) mention a young Loggerhead (length of carapace 64 mm) that was captured in a dipnet at the surface, over 200 fathoms, about 15 miles SE of Key Largo, Florida (25°10'N, 80°02'W; July 26th, 1957).

Mr. Edward M. Cook, of Eau Gallie, Florida, in a letter of August 25th, 1966, addressed to Prof. A. Carr, reported as follows:

"On Thursday, August 18, at approximately 2: 00 A.M., I sighted two loggerhead hatchlings floating in a substantial patch of sargassum weed on the edge of the Gulf Stream, approximately twenty-six miles E N/E of the Sebastian Inlet Florida, or twenty-four miles east of the coast. One hatchling was approximately the size of a half-dollar and the other approximately double that size. The weather was hot with a smooth sea and a slight south-east breeze and the current very strong. There was much other life

of all forms and sizes in the water. Our position was at the edge of the Stream or within a half mile into it."

Mr. Ross Witham, of St. Petersburg, Florida, in a letter of September 6th, 1966 addressed to Prof. A. Carr, wrote:

"Once more I have a report of a hatchling turtle observed in the immediate vicinity of a patch of *Sargassum*. This was about six miles offshore from Hole Sound (27°03'N, 80°09'W), and the sighting was by Mr. Van Smith of Stuart. I believe that in the past I have given you two similar reports."

Carr (1967a: 58; 1967c, 1968: 101) mentioned one man finding nine baby Loggerheads in one raft of *Sargassum* in the Gulf Stream off Florida, adding that one or two Loggerheads had been reported in on a few other occasion.

Late October 1968, after a series of strong northeasterly winds, great quantities of *Sargassum* were found on the beaches of NE Florida. Associated with this weed on the beach very young Loggerheads were found (Caldwell, 1969: 271; length of carapace of one specimen, straight line, 58.6 mm). It seems very likely that these turtles had been travelling with rafts of *Sargassum*, and they were driven to the coast by the storms, raft and all.

That Loggerheads may be associated with *Sargassum* has been mentioned already by the Prince of Monaco (1887: 580; 1932: 10). The Prince describes how, when proceeding from the Azores towards Newfoundland, tufts of *Sargassum* were found up to 45° N: "touffes de sargasses garnie de leur faune spéciale, y compris une tortue (*Thalassochelys caretta*).". Later the position in which this *Caretta caretta* had been observed was given as 41°31'N, 43°22'W (Albert Ier, 1898a: 10; 1932b: 280); as Prince Albert up to 1902 used the meridian of Paris, and not that of Greenwich (which is 2°20'15"W of Paris), this position was corrected to 41°31'N, 41°01'45"W by Richard (1934: 14). Nothing is said about the size of the turtle, but it is unlikely that it was very small, for this would certainly have been mentioned by Prince Albert I.

Perhaps, the record of two juvenile Loggerheads (carapace, long 47.5 mm) found in the stomach of a White-tipped Shark (*Carcharinus longimanus* (Poey)) captured 135 miles due East of Cumberland Island, Georgia (in 30°50'N, 78°45'W; August 22nd, 1957; Caldwell, Carr & Ogren, 1959: 297) is also based upon juveniles that had moved out into the open sea. However, it is not absolutely certain whether the shark took these turtles at the same place as that where it was taken itself. Caldwell, Carr & Ogren (1959: 297) estimate these turtles to be about twelve or thirteen days old. According to the measurements given by Caldwell, Carr & Hellier (1956b: 297) this seems to be correct, but the length of the carapace of the two turtles also comes within the range of variation of hatchling Loggerheads, such as

this is mentioned by Baldwin & Lofton (in: Caldwell, 1959a: 342). The shark was taken 135 miles due east of Cumberland Island, Georgia, an island where Loggerheads are known to nest. If the turtles did come from this nesting site it is hardly probable that they would have succeeded in travelling 135 miles due east. On entering the sea they would be displaced southwards by the inshore current and when getting away farther from the coast they would come under the influence of a current carrying them northwards again. I do not believe that hatchlings will be able to swim straight across the current compensating for the drift by the current. If however, the turtles entered the sea at a point much farther to the south, within twelve days they could easily have come to the position where the shark was taken. Moreover, *Carcharodon longimanus* is not a species of shallow waters (Bigelow & Schroeder, 1948: 360-361; Helm, 1962: 31) and this makes it more likely that the turtles were swallowed by the shark in about the area where it was captured. That one of the turtles was badly macerated and the other in fair condition may not mean more than that they may have been swallowed at different times. The fact that one of them was still in fair condition does not necessarily mean that it had been swallowed a short time before. Sharks have the habit of keeping food undigested in their stomach for fairly a long time (Coppleson, 1958: 20).

The evidence points to the hatchling Leathery Turtles and the hatchling Loggerheads moving away from the beaches and out into the open sea, and with this habit the possibility is given for voyages farther into and across the ocean. When the turtles reach maturity and when the breeding season draws near they will be able to find their way back to the nesting beaches. Of this I am convinced. When roaming about in the ocean they are able to orientate themselves, although we do not know how they do it. If so, a turtle moving to European Atlantic waters may perfectly well be able to find its way back, unless other circumstances prevent its making the return trip. There may well be a difference in the chances of return for the turtles in the northern, central, and southern areas of European Atlantic waters, as well as differences between the species, or between turtles of various sizes. The larger and more powerful swimmers may stand a better chance to return from northern waters to warmer parts of the sea when the cold sets in.

Leathery Turtles, which as far as the records for the last decades show, visit the northern area more or less regularly disappear towards November. A few may have gone so far north that they are overtaken by the cold and do not have chance to get back to warmer regions before they perish. The fact that only very few dead specimens are found in winter in the northern area, and hardly any in the central area can be explained in three ways:

1°, the turtles die at sea, and the carcasses desintegrate far from the coast; 2°, by the beginning of the winter there are no specimens left, because they all have been captured; 3°, most of the Leathery Turtles do move back to more southern regions when the temperatures start going down. When I started collecting data some years ago, I believed that only the first two explanations needed to be considered, but after reconsidering the information we have about the wanderings of turtles in the open ocean, it appears more likely to me that most Leathery Turtles succeed in moving back to more southern regions in autumn and winter. Some, of course, will perish in autumn, and their carcasses will be washed ashore, or these will desintegrate at sea, but others may turn round. Especially those that come to the central and southern areas stand a good chance to move out of European Atlantic waters, profiting from the currents that go southwards along the coasts of Spain and Portugal to warmer areas of the sea. Others may move to the south-west swimming against the current, which will not offer great problems to adult or nearly adult Leathery Turtles, to pass the winter in warmer parts of the open ocean. It may be remembered that Willgoos (1958) suggested that the Leathery Turtles might winter off the Norwegian coast. This I doubt because the climate in the area between Norway, Scotland, and Iceland seems to be unfavourable for turtles to survive for a long time.

The smaller Loggerheads and Kemp's Ridleys are in a different position. Apparently being more hardy than the Leathery Turtle, they will stay in northern waters longer. When in autumn and winter gales and storms set in, they may be driven to our coasts, and it may be impossible for them to move southwards and south-westwards against these gales. Again the specimens in the central and southern areas stand the best chance of survival. Not only by the climate being milder, but also by making use of the southwards directed currents. If more attention was paid to the occurrence of Loggerheads in the Bay of Biscay and along the Portuguese coast, especially with regard to the distribution of the records over the months of the year, this might provide us with interesting information concerning the problem of the movements and whereabouts of these turtles in winter. It must be remembered that usually only the specimens that are stranded will be recorded, and it may be of course that more Loggerheads and Kemp's Ridleys come to our waters, and that a number of them do turn back in time.

Summarizing what has been said above, I do believe that the journey of turtles across the Atlantic to European Atlantic waters is one of which a return is possible as far as the orientation of the turtles is concerned, but that many of them (especially the smaller ones) may be trapped when the

cold sets in and when gales and storms use a force greater than can be exerted by the swimming turtle itself.

APPENDIX I

Records from some other parts of the North Atlantic Ocean.

When studying the distribution and origin of the turtles that are found in European Atlantic waters it is necessary to pay some attention to the distribution of the species in other parts of the North Atlantic Ocean. To this purpose data have been collected on the distribution of *Dermochelys coriacea*, *Caretta caretta* in the western Atlantic. For *Lepidochelys kempii* data are given on the distribution in the Western Atlantic region, the Azores, Madeira and Mediterranean. However, the search for data was limited to the literature available to me, and it did not lead to search collections and archives for further information. Thus, the data for North American Atlantic waters will be much less complete than those for European Atlantic waters.

***Dermochelys coriacea* (L.)**

It is interesting to note that the majority of the records from North American Atlantic waters are from the cooler waters (Newfoundland, Nova Scotia, New England) and but rarely from the warmer more southern parts. There is one exception, however, viz., the observation by Leary (1957: 232) who sighted about a hundred Leathery Turtles off the Texan coast, and that at a time when one could exclude the possibility of its being a breeding migration.

Literature contains a number of general statements about the occurrence of *Dermochelys coriacea* along the North American Atlantic coast. Stejneger & Barbour (1917: 123; 1923: 140) state that the Leathery Turtle occasionally goes north as far as Maine, and later (Stejneger & Barbour, 1933: 152; 1939: 170; 1943: 211; Schmidt 1953: 111) north as far as Nova Scotia. Ditmars (1936: 380), Carr (1952: 442), and Caldwell (1960: 8), state the distribution to extend from Nova Scotia to Mar del Plata, Argentina. Flores (1969: 5) misunderstood these statements to mean that the range from Nova Scotia to Mar del Plata was the breeding range.

As pointed out by Bleakney (1965: 121) the presence of Leathery Turtles in the Newfoundland-New England region is an annual event, *D. coriacea* arriving in June and disappearing in October (Bleakney, 1965: 125, table 4).

Bleakney (1965: 121, table 1) mentions 88 records of *D. coriacea* from the Newfoundland-New England area from the period 1824-1964. If I am correct in assuming that many of the records of the so-called Great Sea Serpent, observed in this area, are in fact based upon Leathery Turtles, the

number of observations will prove to be much higher and the record then will go back to the end of the eighteenth century. To me it seems to be more than a mere coincidence that the number of records for the Great Sea Serpent, which Heuvelmans (1965: 647; 1968: 568) named *Plurigibbosus novae-angliae* (placed by him with the Archaeoceti, but possibly a Sirenian according to Heuvelmans 1965: 645, note 2; 1968: 568, note 2), diminished inversely proportionally to the increase in the number of records for the Leathery Turtle in the same area (Brongersma, 1968f: 223-224, table I; 1968g: 73).

NEWFOUNDLAND

Conception Bay, 29.ix.1964: Bleakney (1965: 122); Dunfield, Trinity Bay, 24.viii.1946: Squires (1954: 68), Logier & Toner (1961: 57).

CAPE BRETON ISLAND

Early viii.1955: Bleakney (1965: 122).

NOVA SCOTIA

The occurrence in Nova Scotia is mentioned, i.a. by: McKay (1896), Stejneger & Barbour (1933: 152; 1943: 211), Ditmars (1936: 380), K. P. Schmidt (1953: 111), Carr (1952: 442), Conant (1958: 79), Caldwell (1960: 8), [Montoya] (1966: 12).

Halifax Co.: near Prospect, about 30.viii.1889: Piers (1890: 470; 1897: 264), Bleakney (1965: 162); Prospect, viii.1897, 13.viii.1963, 7.ix.1964: Bleakney (1965: 162); Lower Prospect, 14.ix.1962: Bleakney (1965: 162); 3 miles off Hubbard's Cove, St. Margaret's Bay, to the westward of Halifax, 9.ix.1894: Piers (1897: 264), Bleakney (1965: 162); Hubbard's Cove, 16.viii.1895, 2.ix.1934; Shad Bay, 23.viii.1909; Portuguese Cove, summer 1913; Pennant, 5.ix.1915; Eastern Passage, 10.vii.1934; Northwest Cove, 9.viii.1946; Sambro, 21.viii.1955; West Dover, 21.viii.1961; Terence Bay, 11.ix.1961, 17.vii.1964; Tangier, ix.1964; Richmond Co.: St. Peters Canal, ca. 1940; Coast of Nova Scotia, 25.x.1928: Bleakney (1965: 122); Digby Co.: Seawall, 20.vii.1965: Zullo & Bleakney (1966: 162).

OBSERVATIONS AT SEA

45°25'N, 58°46'W, 13.ix.1963: Dr. J. F. Willgoos (in litt.).

GULF OF ST. LAWRENCE

1830's: on the basis of a contemporary press report, Schlegel (1838: 11) mentioned the presence of a Leathery Turtle in the Gulf of St. Lawrence.

Probably the report on a creature seen off the East coast of Prince Edward

Island in the summer of 1845 (Lyell, 1849: 132) was also based upon a Leathery Turtle.

NEW ENGLAND

Besides records from the various states (Maine, New Hampshire, Massachusetts, Rhode Island, and Connecticut), there are also general statements, e.g., by Babcock (1938: 48) who remarks that there are numerous New England records for *Dermochelys coriacea*.

MAINE

The occurrence of *D. coriacea* in Maine waters was mentioned, i.a., by Stejneger & Barbour (1917: 124; 1923: 139).

In the following list of individual records from Maine, B. (1919) stands for Babcock (1919: 335-336), B. (1939) for Babcock (1939: 50), B. (1945) for Babcock (1945: 46), and S. & P. for Scattergood & Packard (1960: 47).

Off Saco, ix.1863: F. H. Brown (1863: 326); off the coast of Maine, 1866: B. (1919), S. & P.; Naskeag Point, 1877: B. (1919), S. & P.; off Cape Elizabeth, ix.1878: B. (1919), S. & P.; Halfway Rock, Casco Bay, 22.vii.1885: S. & P.; ?Portland, 1885, B. (1919); off Portland, 4.viii.1887: S. & P.; off Cape Newagen, 19.viii.1908: S. & P.; ?Portland, 1908: B. (1919); Bath, 1908: B. (1919); off Biddeford, 1908: B. (1919); S.W. of Wood Island, 21.viii.1908: S. & P., ?B. (1939); S.W. of Boon Island, 24.viii.1908: S. & P.; near Portland, 1909: B. (1919), S. & P.; S.W. of Seguin, 21.x.1919: S. & P.; off Old Orchard Beach, 1920?, 1921?: B. (1939), S. & P.; off Casco Bay, 2.viii.1926: S. & P.; between Cape Elizabeth and Portland Lightship, 9.ix.1928: S. & P.; South Portland, 20.ix.1928: S. & P.; off Cod Lodge, Casco Bay, 4.viii.1932: S. & P.; off Rockland, 1934: B. (1939), S. & P.; off West Southport, 1937: B. (1939); Isle au Haut, 1.viii.1937: S. & P. (the same as the preceding?); Halfway Rock, Casco Bay, 8.viii.1937: S. & P.; off Seguin, 25.viii.1937: Whiteley (1938: 44), B. (1939), S. & P.; of Boothbay Harbour, 1.viii.1939: B. (1945), S. & P.; off New Harbour, 29.vii.1940: B. (1945), S. & P.; Pemaquid Point, 3.viii.1944: B. (1945), S. & P.; Camp Ellis, 25.vii.1948: S. & P.; McKinley, 19.ix.1948: S. & P.; Criehaven, 22. vii.1950: S. & P.; Frenchman Bay, 12.viii.1951: S. & P.; a few yards off-shore of the island of Vinal Haven, 10.viii.1957: Ray & Coates (1958; skull and lower jaw AMNH 85645), S. & P.; Bantam Buoy, 18.viii.1957: S. & P.; Lumbo Buoy, 28.viii.1958: S. & P.; New Portland Lightship, 6.viii,1959: S. & P.; 1700 yards NE of Portland Lightship, late viii.1962, and same specimen 5¼ miles NNE from that point a week later: Moulton (1963); between Cod Lodge and Halfway Rock, due south of Basin Point on the West Harpswell Peninsula

late viii (or early ix?). 1962: Moulton (1963); 4700 yards from Portland Lightship, late viii (or early ix?) 1962: Moulton (1963).

Near Portland, off Saco, Penobscot Bay: Henshaw (1904: 1).

NEW HAMPSHIRE

Off Isles of Shoals, 1921: Babcock (1939: 50).

MASSACHUSETTS

Cope (1876: 50), Eug. Smith (1898-1899: 22), Ditmars (1910: 5). Massachusetts Bay, 1824: Storer (1840: 16), Babcock (1919: 335); Cape Cod, 1848; Nahant, 1852; off Marion, Buzzard's Bay, 1879; Annisquam, 1880; off Cape Ann, 1880; Gloucester, 1882; near the coast of Essex Co., 1882; near Boston, 1885; Rockport, 25.viii.1885; Buzzard's Bay near Woods Hole, 1891; a few miles S of No Man's Land, early vii.1907; Corporation Point, Cape Cod, 1917: Babcock (1919: 335-336); off East Dennis, Cape Cod, 1924; off Chatham, Cape Cod: Babcock (1939: 50); off Newburyport Harbor, 9.viii.1942: Babcock (1945: 46).

Off Rockport, Annisquam, Salem, Nahant; Massachusetts Bay, near Cape Cod: Henshaw (1904: 1).

RHODE ISLAND

Rhode Island, viii.1779: Schneider (1789: 29), Schlegel (1838: 11); Narragansett Bay, 1878; two specimens, vicinity of Southeast Point, Block Island, ca. 30.vii.1886: Babcock (1919: 335-336); two specimens off Block Island, 1936: Babcock (1939: 50); Newport: Henshaw (1904: 1).

CONNECTICUT

Stonington, vii.1875, vii.1876; Long Branch, 1875; between New London, Conn., and Montauk Point, Long Island, 1875: Babcock (1919: 335); New London: Lamson (1935: 35); Long Island Sound: Henshaw (1904: 1).

NEW YORK

Eug. Smith (1898-1899: 22).

New York, autumn 1811: Mitchill (1812: 191), Strauch (1865: 133); New York, 1908: Anonymus (1909: 495); Long Island Sound, 1826: Babcock (1919: 335) (perhaps the same as the record placed under Connecticut by Henshaw (1904: 1)); Patchogue, Long Island, ca. 1896: R. C. Murphy (1916: 57); Long Island: Ditmars (1910: 5); vii (or viii?) 1927, Fire Island Inlet, southern shore, Long Island: Hassler (1927: 502); about 20-25 miles SSE of Montauk, Long Island, 30.ix.1961, speared by fishing boat "Happy Days II", skipper: Frank Hendrickson, reported to AMNH.

NEW JERSEY

Sandy Hook, 1816: Babcock (1919: 335); four specimens, New Jersey: Carr (1952: 450); Cape May, summer 1903: Anonymus (1904: 143); Asbury Park; Delaware Bay (in Cope's collection): Stone (1906: 168); off Beach Haven, vii.1927: Hassler (1927: 502); Point Pleasant, Seaside Park, skeleton, AMNH 32825; ca. 20 miles out from Atlantic Highlands, 19.viii.1962, harpooned by a Mr. Taylor, offered to AMNH, but rejected with thanks.

DELAWARE

Delaware Bay, Lewes: Fowler (1925: 61); Delaware Bay, 1872: Carr (1952: 450).

MARYLAND

D. coriacea has been recorded from Chesapeake Bay (inter alia by Agassiz, 1857: 373, and by Strauch, 1865: 133), but it is not stated whether it has been taken in Maryland or in Virginia waters. As stated by McCauley (1945: 27) the species will certainly be found off the coast of Maryland; F. J. Schwartz (1961: 38) includes it in the key to the turtles of Maryland.

J. D. Hardy (1969: fide Pritchard, 1971: 31) mentions eight records from Chesapeake Bay, i.e., one from Dares Beach, Calvert Co.

VIRGINIA

Chesapeake Bay, 1840: Strauch (1865: 133); 2 miles SE of Great Wicomico Lighthouse, near Fairport (Northumberland Co.), v-vi.1952; Reed (1957a: 23); Parramora Island, Accomac Co.: McCauley (1945: 27).

D. Jones (1968; fide Pritchard, 1971: 31) gives records from Virginia.

NORTH CAROLINA

Brimley (1926: 89) states that *D. coriacea* is occasionally found off the North Carolina coast.

Beaufort, 27.v.1897: Brimley (1915: 204; 1920: 63; 1943: 19); Wilmington, 1879: Carr (1952: 450); Manteo, vi.1935: Brimley (1943: 19).

FLORIDA

Atlantic coast: St. Augustine: Loennberg (1894: 317); Flagler Beach, 6.vi.1947 (nesting): Carr (1952: 451, pls. 80, 81), Caldwell, Carr & Hellier (1956a: 279, 283), Caldwell (1959b: 286), Pritchard (1971: 14); Indian

River Co., 8.vi.1937 (tracks), Indian River, summer 1954 (half-grown specimen); St. Lucie Co., 30.iv.1957 (tracks): Caldwell (1959b: 286, 290); St. Lucie Co., 6. or 7.v.1957 (nesting): Caldwell (1959b: 286, 290), Pritchard (1971: 14); Ft. Pierce, summer ca. 1954 (nesting), 15.iv.1957 (tracks of two specimens): Caldwell (1959b: 286, 290); Hutchinson's Island, ca. 15.vii.1955 (tracks): Caldwell, Carr & Hellier (1956a: 280, 283); Hutchinson's Island, ca. 26.vii.1956 (nesting), 17.v.1957 (6½ miles S of Ft. Pierce Inlet, nesting), 22.v.1957 (4 miles S of Ft. Pierce Inlet, nesting); Jupiter Island, 27.v.1957 (tracks), 30.v.1957 (nesting); Juno Beach, 11.vi.1957 (nesting): Caldwell (1959b: 286); Miami Beach, vii.1955 (hatchlings): Allen & Neill (1957: 143), Pritchard (1971: 14); Miami Beach, eggs, AMNH 22549; South Beach, Fort Lauderdale, 5.v.1969: Pritchard (1971: 14).
Tortugas: Agassiz (1857: 373).

Gulf coast: about 10 miles offshore from Sarasota, 25-27.xi.1961, two or three specimens seen, and 27.xi.1961 one large ♂ captured; vicinity of Sarasota, viii.1954; Sarasota-Charlotte Harbor area, a few miles offshore more than 30 years ago; Ulmer Cove near Panacea, Wakulla Co., 8 ft of water, 27.iii.1962; mouth of Ochlocknee river, Wakulla-Franklin county line, 8 ft of water, 3.iv.1962; St. Andrew Bay near Panama City, Bay Co., spring 1963, a number of specimens; approximately 1 mile inside ship channel connecting the bay and gulf, 14.iv.1963, four specimens seen by L. H. Ogren; 15.iv.1963 remains of butchered specimen: 21.iv.1963, dead near jetties: Yerger (1965: 365); beaches between Phillips Inlet, Walton Co., and Destin, Okaloosa Co., 1.ix.1962, 20-30 hatchlings: Yerger (1965: 365), Pritchard (1971: 14); Panama City, Bay Co., summer 1968, ashore in daylight: Pritchard (1971: 14).

Duellman & Schwartz (1958: 272) mention three Leathery Turtles from Dade Co., two from Biscayne, and one from Miami Beach.

LOUISIANA

Off S.E. Louisiana, ca. 27.vii.1951, ca. 16.vi.1952: Dunlap (1955: 58, 59).

TEXAS

Brazoria Co.: B. C. Brown (1950: 249); Copano Bay, at the town of Bayside, 9.ii.1951 (dead male): Gunter & Hildebrand (1951: 732); about one hundred specimens, approximately 75 yards from the beach along a thirty mile line north of Port Aransas (off the islands of St. Joseph and Matagorda), 17.xii.1956: Leary (1957: 232); Padre Island, v.1932 (nesting): H. H. Hildebrand (1963: 106); several miles south of Sabine and along coast of Jefferson Co.: Guidry (1953: 56).

MEXICO

[Montoya] (1966: 12) mentions *D. coriacea* from the coasts of Tamaulipas, Veracruz, Campeche, Yucatán, and Quintana Roo.

Pritchard (1971: 15) reports nesting on the East coast of Arrecife Alacranes, near Progreso, Yucatán, and on Isla Pérez and Isla Pájaros.

Coast of Veracruz (nesting); Tamaulipas: H. H. Hildebrand (1963: 106), Pritchard (1971: 15).

BAHAMA ISLANDS

Agassiz (1857: 373). No specified records are available to me.

Between NORTH AMERICA and BERMUDA

33°54'N, 67°43'W, 23.iv.1965, moving East: H. Neth. M.S. "Snellius".

BERMUDA

Goode (1877: 290); vii.1835: Mowbray & Caldwell (1958: 148); occasionally seen: Mowbray & Caldwell (1958: 148).

Caretta caretta (L.)

NEWFOUNDLAND

43°24'N, 50°15'W, 6.i.1953, dead, trawled from 100 fathoms: Squires (1954: 68), Conant (1958: 68), Scattergood & Packard (1960: 48), Logier & Toner (1961: 56), Bleakney (1965, table 1).

NOVA SCOTIA

Carr (1952: 382-283), Caldwell (1960: 12), Bleakney (1965: 121, table 1, 123).

Halifax, 20.viii.1931: Bleakney (1958: 18, 104, map 35; 1965: 11).

NEW ENGLAND

Babcock (1938: 43) remarks that the Loggerhead is the commonest species in New England.

MAINE

Bleakney (1965: 121, table 1).

Flag Id., Sagadahoc Co., 15.viii.1944: Scattergood & Packard (1960: 48); this turtle has been recorded erroneously from New Harbor by Chace (1951: 84).

MASSACHUSETTS

Henshaw (1904: 4), Stejneger & Barbour (1917: 123; 1923: 139; 1933: 151; 1943: 210), Ditmars (1910, 1922: 44; 1946: 299), McCauley (1945: 26), Bleakney (1965: 121, table 1).

Woodshole: Sumner, Osborn & Cole (1913: 774), Layne (1952: 115); Cape Cod: Pope (1939, 1967: 279).

RHODE ISLAND

Newport: Pilsbry (1916: 265).

CONNECTICUT

Lamson (1935: 34), Bleakney (1965: 121, table 1).

Off Norwalk: Carr (1952: 389).

NEW YORK

New York Bay; Long Island: Mt. Sinai Harbor; South Beach, Mt. Sinai; Lynbrook; Orient; Gardiner's Bay; Long Island Sound: R. C. Murphy (1916: 57); Long Island: Ditmars (1910, 1922: 44), Pope (1939, 1967: 279).

NEW JERSEY

Belford, New York Bay; Sea Isle City, early vii.1905; Stone Harbor, 25.vii.1906 (washed ashore); Fowler (1907: 207); Ocean City, Green Creek: Fowler (1908: 200); off Wildwood: Richards (1930: 143); Delaware Bay: off Green Creek and Dias Creek, Cape May, Anglesea: Fowler (1907: 209).

DELAWARE

Delaware Bay: Pilsbry (1916: 267); Lewes: Fowler (1925: 61).

MARYLAND

F. J. Schwartz (1961: 37).

Ocean City, 1936; Hooper's Island, Dorchester Co., 1933; near Cambridge, Dorchester Co., ca. 5.x.1939: McCauley (1945: 26).

VIRGINIA

Pope (1939, 1967: 279: nesting), Carr (1952: 390, formerly nesting).

Hog Island: Brady (1925: 111), McCauley (1945: 26); 3 miles off Wicomico Lighthouse near Fairport, 6.i.1956: Reed (1957a: 23); Elizabeth City; Norfolk; Princess Anne: Dunn (1918a: 22); Virginia Beach, Old Point Comfort: Fowler (1925: 67).

NORTH CAROLINA

Brimley (1920: 63; 1926: 89) states that the Loggerhead is common in summer, and (1926: 89) adds that it breeds on the Banks; Pope (1939, 1967: 279, breeding), Carr (1967*c*, 1968: 223 nesting).

Pamlico Sound: Coker (1906: 60), Brimley (1915: 204; 1943: 18); Cape Lookout: Coles (1914: (3), nesting); Beaufort, Coker (1906: 60, nesting), Brimley (1915: 204; 1943: 18, breeding), Stejneger & Barbour (1917: 123; 1923: 139; 1933: 151; 1943: 210, breeding), Schmidt (1953: 107, breeding); from Hoop Hole Camp (5 miles W of Fort Macon) to about 4 miles W of the "Old Steamer" (10 miles W of Fort Macon), nesting: Coker (1906: 63); Pains Bay, Dare Co.: Coker (1906, pl. xix fig. 1).

Emerald Isle, Carteret Co., two juvs., leg. R. M. de Bree, AMNH 92744, 92745, hatched on 23.ix.1963.

SOUTH CAROLINA

Charleston: Schneider (1783: 300), H. M. Smith & Taylor (1950: 16); Cape Romain (Cape I., Raccoon Key, Bull's I.): Baldwin & Lofton (in Caldwell, 1959*a*: 320).

GEORGIA

Carr (1967*c*, 1968: 223).

Sea Island: De Sola & Abrams (1933: 11), Carr (1952: 392); Atwood Creek near Darien: Carr (1940: 106-107; 1952: 387, creek in McIntosh Co.); Sapelo Isl.: Caldwell (1962*a*: 287); Little Cumberland Isl.: Caldwell (1962*a*: 288), Carr (1967*c*, 1968: 225); Cumberland Isl.: Caldwell (1962*a*: 292); Jekyll Isl.: Caldwell, Carr & Ogren (1959: 296), Caldwell, Berry, Carr & Ragotzkie (1959: 310); Jekyll, UKMNH 8105-8109.

FLORIDA

Florida: Carr (1967*c*, 1968: 223).

Atlantic coast: Duval Co.: Carr (1940: 106); St. Johns Co.: Carr (1940: 106); vicinity of St. Augustine, St. Johns Co.: Thorson (1968: 594); Flagler Co.: Carr (1940: 106); Volusia Co.: Carr (1940: 106); Daytona, Volusia Co., leg. S. N. Chamberlain, MCZ 13416; Daytona: Caldwell, Carr & Hellier (1956*b*: 292); Coronado Beach at New Smyrna: Loennberg (1894: 318); Brevard Co.: Carr (1940: 106); Micco, Brevard Co., 1949, AMNH 4633-4667, 4671-4673, 4691-4694, 4710-4712, 4715-4735; opposite Micco, AMNH 4630, 4632; Melbourne, Brevard Co., to Palm Beach, Palm Beach Co.: Carr (1967*c*, 1968: 224); Cocoa Beach, Fort Pierce, St. Lucie Co.: Caldwell,

Carr & Hellier (1956*b*: 292); Fort Pierce, St. Lucie Co., AMNH 85475 (2 specimens), 85491 (11 specimens); Hutchinson's Island: opposite Jensen Beach, Martins Co.: Caldwell, Carr & Ogren (1959: 296), Caldwell, Carr & Hellier (1956*b*: 292), Carr (1967*c*, 1968: 224), Rounta (1968); Jupiter Inlet, Martin Co.: Caldwell, Carr & Hellier (1956*b*: 292); Pompano Beach, Broward Co., hatched 16.viii.1967, AMNH 102570, 102571; Fort Lauderdale, Broward Co.: McFarlane (1963: 152); Governor Pass near Miami, Dade Co.: Duellman & Schwartz (1958: 271); Biscayne Bay, Dade Co.: Carr (1952: 392); Biscayne Bay, LACM 8102, 8103.

Florida Keys, Dry Tortugas:

15 miles SE of Key Largo, 26.vii.1957: Caldwell, Carr & Ogren (1959: 297); Lower Metacombe Key: De Sola (1935: 44); Malecombe Key UKMNH 88858; Long Key: Duellman & Schwartz (1958: 271); Long Key, leg. Dr. W. Wurdemann, MCZ 42248, Garden Key: Yarrow (1882: 28); Key West: Loennberg (1894: 318), Deraniyagala (1946: 195), Carr (1952: 386), Duellman & Schwartz (1958: 271); Key West, L. Agassiz, 1856, MCZ 1408 (7 specimens); Key West, G. D. Allen, 1864, MCZ 4017 (2 specimens); Key West, MCZ 1409 (2 specimens); 30 miles from Key West in Florida Straits: Carr (1940: 106); Florida Keys, hatched 15.ix.1959, died 21.viii.1960, don. H. Clement, MCZ 74885; Loggerhead Key: Nutting (1895: 119), Mast (1911: 63), Pope (1939, 1967: 279), Loveridge (1945*a*: 17; 1945*b*: 18); Dry Tortugas: Pilsbry (1910: 304; 1916: 289); Duellman & Schwartz (1958: 271); Dry Tortugas, leg. Davenport Hooker (Brooklyn Mus.), MCZ 44708, 44709; Tortugas, 3 embryos, viii-1925, leg. Dr. H. Boschma, RMNH 9924.

Gulf coast Monroe Co.: Carr (1940: 106); Cape Sable: Carr (1967*c*, 1968: 224); Collier Co.: Carr (1940: 106); Bonita Beach, Lee Co.: Mittleman (1950: 23); Charlotte Co.: Carr (1940: 106); Stump Pass, Charlotte Co. (in original reference De Soto Co.): Brice (1898: 287); Osprey, Sarasota Co.: Pilsbry (1916: 265); Pinellas Co.: Carr (1940: 106); Indian Rock Beach, leg. Harold E. Wicks, skull, received 13.vii.1956, AMNH 75638; Levy Co.: Carr (1940: 106); Cedar Key, Levy Co.: Caldwell, Carr & Hellier (1956*b*: 301); Franklin Co.: Carr (1940: 106); Fort Walton on Santa Rosa Island, Okaloosa Co.: Caldwell, Carr & Hellier (1956*b*: 301).

Florida, MCZ 1407.

ALABAMA

Chermock (1956: 47), no individual records are given.

Dealing with preserving turtles, Chermock writes (1956: 12) "The mouth should be propped open with a cork or a short stick, because the teeth are often used in identification." [sic].

LOUISIANA

Cagle (1952: 30), no individual records.

Mouth of the Mississippi, probably near Pass à l'Outre: Caldwell, Carr & Ogren (1959: 296).

TEXAS

Seabrook, Harris Co.; Pt. Isabel, Cameron Co.: B. C. Brown (1950: 246).

MEXICO

H. M. Smith & Taylor (1950: 16) state that *Caretta caretta* occurs along the whole of the Atlantic coast of Mexico, but they add that the only definite record is from Yucatán; Carr (1957: 55, note 1) mentions the Loggerhead's breeding in Quintana Roo. Ivanoff (1965: 12, figs.) in an article on turtle fishing in Yucatán also deals with the Loggerhead. [Montoya] (1966: 12) states that *Caretta caretta* is very common in the Gulf of Mexico and in the Caribbean.

CUBA

Playa Baracoa, 15 miles W of Havana: Caldwell, Carr & Hellier (1956b: 295); Havana Harbour: Barbour (1945: 76); Varadero Beach, Gibara: Caldwell, Carr & Hellier (1956b: 295); Cuba, leg. N. A. Bishop, MCZ 12609.

BAHAMAS

Hatchet Bay, Eleuthera Island, leg. S. Campbell Dale, 1948, AMNH 69258, 69259; Bahamas, leg. J. D. Sargent, 1861, MCZ 1412; Bahamas, don. De Haas, 1885; Brongersma (1961: 2).

BERMUDA

Goode (1877: 290), Babcock (1937b: 596), Mowbray & Caldwell (1958: 148), Carr, (1967c, 1968: 225); Bermuda, 28.v.1921, MCZ 28202.

H. M. Smith & Taylor (1950: 16) restricted the type locality of *Testudo caretta* L. to Bermuda.

***Lepidochelys kempii* (Garman)**

In literature this species has been recorded under various names, e.g., *Thalassochelys kempii*, *Thalassochelys (Colpochelys) kempii*, *Colpochelys kempii*, *Caretta kempii*, *Lepidochelys olivacea kempii*, *Lepidochelys kempii*, and even (by Popovici & Angelescu, 1954: 551) as *Caretta caretta kempii*.

Some specimens were originally recorded as *Caretta caretta*. The fact that on the east coast of U.S.A. the name 'Hawksbill' is used for Kemp's Ridley (Coker, 1906: 57; Fowler, 1909: 406; Brimley, 1943: 19), may have led

to some ridleys having been recorded as *Eretmochelys imbricata*, the species which to zoologists is commonly known as 'Hawksbill Turtle'. It is suggested that remarks by fishermen about the 'Hawksbill' have been transferred by zoologists to *Eretmochelys imbricata*, and that thus statements about *E. imbricata* not infrequently reaching the coasts of southern New England (Sumner, 1909: 985), or about *E. imbricata* being more common in Buzzard's Bay, Massachusetts, than the Loggerhead (R. C. Murphy, 1916: 58), are based upon Kemp's Ridleys, rather than on true Hawksbills.

NEWFOUNDLAND

Although it is likely that *L. kempii* will be found one day in Newfoundland waters, I do not believe that the report of a fisherman who sighted a large grey turtle (Squires, 1954) is any proof of Kemp's Ridley occurring in the Newfoundland area. *L. kempii* may be greyish in colour, but it cannot be described as being large. Just the opposite is the case; *L. kempii* is a small turtle as compared to the Loggerhead, the Green Turtle, and the Leathery Turtle. If the turtle sighted in Newfoundland was indeed large and grey, it is more likely that the fisherman saw a Leathery Turtle. Scattergood & Packard (1960: 48) were also of the opinion that the observation by Squires "cannot be considered as grounds for extending the known range" of Kemp's Ridley.

NOVA SCOTIA

The following four records were given by Bleakney (1955: 137; 1958: 18, 130 map 34), and by Logier & Toner (1955: 50; 1961: 55). Bleakney (1965: 121, 123) and Conant (1958: 69) give general references to Kemp's Ridley in Nova Scotia.

Lahave Island, Lunenburg Co., 15.viii.1910 (Mille, 1948: 15, *Caretta caretta*); Spry Harbour, Halifax Co., 23.viii.1910 (Rept. Prov. Mus. & Sci. Libr., 1910: 11, *C. caretta*); Margaretsville, Annapolis Co., 14.x.1928 (Rept. Prov. Mus., 1928: 14, *C. caretta*); Bay of Fundy (Rept. Prov. Mus., 1931-1932: 22, *C. caretta*).

MAINE

Bleakney (1965: 121).

Small Point, Sagadahoc County, 19.vii.1942: Scattergood & Packard (1960: 49).

MASSACHUSETTS

Stejneger & Barbour (1917: 123; 1923: 139; 1933: 152; 1943: 210), Ditmars (1936: 382), Babcock (1938: 46), Pope (1939, 1967: 289), Carr (1952: 396).

Off Rockport, 1910: Dodge (1944: 120); Swampscott, 10-20.x.1905: Hay (1908: 183), Babcock (1930a: 21), Dodge (1944: 120); outside Boston harbour, Massachusetts Bay, 1942: Barbour (1942: 25, fig.), Dodge (1944: 120), Carr (1952: pl. 70), MCZ 46537; Buzzard's Bay: Carr (1957: 53); Woods Hole: Dodge (1944: 120); Woods Hole, taken in a fish pound, ix.1870, S. J. Baird, MCZ 42249 (Smithsonian no. 11505); No-Man's-Land, 30 miles south of Gay Head, Martha's Vineyard, iii.1903: Carr (1942: 11), Barbour (1942: 257), Dodge (1944: 120); Martha's Vineyard: Carr (1955: 149; 1957: 53); Massachusetts: Dodge (1944: 120); Massachusetts Bay: Dodge (1944: 120); Atlantic Ocean: Dodge (1944: 120).

NEW YORK

New York Harbor, i.1925, AMNH 28863; Oyster Beach, Nassau Co., Long Island, 9.xi.1930, AMNH 44867; Short Beach, Jones Inlet, Jones Beach State Park, Nassau Co., Long Island, 5.iii.1948, AMNH 69604 (skull + skeleton); ♀, West Meadow Beach of Long Island Sound, near Setauket Suffolk Co., 17.xii.1957, AMNH 88344; Long Island Sound: Babcock (1938: 46); Staten Island: Davis (1931: 35); Staten Island, AMNH 9723; Lower New York Bay: De Sola (1931: 135).

NEW JERSEY

Pope (1939, 1967: 288).

Atlantic City: Hay (1908: 184), Fowler (1909: 406), Babcock (1930a: 21).

VIRGINIA

Reedville, 1932, leg. W. K. Hadley: Carr (1942: 11), Reed (1957a: 23), J. D. Hardy (1962: 217); 3 miles SE of Great Wicomico Lighthouse, leg. Capt. W. J. Biddlecomb, 10.vi.1956: Reed (1957a: 23; 1957b: 91, USNM 137573), J. D. Hardy (1962: 218); Gloucester Point, 2.vii.1951, reported by W. H. Massmann: J. D. Hardy (1962: 219).

Mr. W. H. Massmann stated (1962) that he had seen several other Kemp's Ridleys in the Gloucester Point area (J. D. Hardy, 1962: 219).

MARYLAND

Parker's Creek, 26.vii.1944, disarticulated skeleton, leg. W. E. Salton: J. D. Hardy & Mansueti (1962: 8), J. D. Hardy (1962: 217, 218); Camp Bay Breeze, near Lushy, Calvert Co.: J. E. Cooper (1947: 2, *Caretta caretta*), J. D. Hardy (1962: 218); mouth of Jones Falls, Baltimore Harbor: J. E. Cooper (1947: 2, *Caretta caretta*, brought by ship to harbour?), J. D. Hardy (1962: 218).

NORTH CAROLINA

Pope (1939, 1967: 288). Brimley (1920: 63; 1926: 89) remarks on the presence of Kemp's Ridley off the North Carolina coast in summer.

Cape Hatteras: Hay (1908: 184), Brimley (1915: 204; 1943: 19), Schmidt & Dunn (1917: 50), Stejneger & Barbour (1917: 123; 1923: 139; 1933: 152; 1943: 210), Babcock (1938: 46); Cape Hatteras, AMNH 2205.

Beaufort: Coker (1906: 57), Hay (1908: 184), Siebenrock (1909: 551), Brimley (1915: 204; 1943: 19), Carr (1942: 11; 1952: 401, pl. 69).

GEORGIA

Sapelo Island: Martof (1963: 71); SE Georgia: De Sola & Abrams (1933: 11); 1½ mile off St. Simon's, Brunswick, 4.ix.1941, AMNH 46781.

FLORIDA

SE Florida, fairly common: De Sola (1935: 44).

Atlantic coast: Fernandina: Carr (1955: 148); St. Augustine: Carr (1955: 149); vicinity of St. Augustine: Thorson (1968: 594); Carnaveral: Carr (1955: 149); Melbourne (1955: 149); Salerno: Carr (1942: 11); St. Marks, Carr (1952: 402); Florida Bay: Carr (1955: 149).

Florida Keys, Dry Tortugas: Key West: Carr (1942: 10), Barbour (1945: 77), Grant (1946: 39), Duellman & Schwartz (1958: 271), H. M. Smith & Taylor (1950: 15, Key West restricted type locality of *Thalassochelys kempii* Garman, 1880); Sands Key, Carr (1942: 11; 1955: 147), Duellman & Schwartz (1958: 271); Dry Tortugas: Carr (1942: 10), Barbour (1945: 78); Tortugas, leg. Harrison, MCZ 1406; between Marquesos Keys and Tortugas, 10.xii.1966: Chávez (1968: 14).

Gulf coast: St. Petersburg: Carr (1961a: 8); Withlacoochee-Crystal river area: Carr & Caldwell (1956: 9), Carr (1958: 245); Cedar Key: Carr (1942: 10); Seashore Island: Carr (1940: 107); Suwannee Delta: Carr (1955: 149); Fort Walton: Caldwell (1962b: 6-7). Garman (1880: 123) described *Thalassochelys kempii* from the Gulf of Mexico, upon specimens received from Mr. R. M. Kemp, of Key West. It seems likely that the syntypes (Barbour & Loveridge, 1929: cotypes) came from the vicinity of Key West.

ALABAMA

Chermock (1956: 47), no individual records.

MISSISSIPPI

Mississippi Sound, AMNH 46778 (was labelled *Caretta caretta*).

LOUISIANA

Cagle (1952: 31).

Lake Borgne, vi.1954; Breton Island, 1958; Ile Dernière, 25.iv.1952; Oyster Bayou, 25.iv.1952: Dobie, Ogren & Fitzpatrick (1961: 109-110); 28°36'N, 90°11'W, about 65 miles S of Morgan City: Carr & Caldwell (1958: 246); 11 km from Empire, 7.x.1966; 29°05'N, 91°01'W, about 10 km W of Ile Dernière, 13.iii.1967; 29°04'N, 91°03'W, 15 km W of Ile Dernière, 27.ix.1966; 29°30'N, 92°20'W, approximately 36 km SW of Vermillion Bay, 3.viii.1966; 37 km E of Cameron, near Port Joseph, 26.vii.1966: Chávez (1967: 4-5; 1968: 14-16; 1969: 33, repr.: (8)).

TEXAS

Velasco: Strecker (1915: 15), Dunn (1918b: 75), Pope (1939, 1967: 288), B. C. Brown (1950: 248); Port Aransas: H. H. Hildebrand (1963: 106); Padre Island: Werler (1951: 37, nesting), Carr (1961a: 11); St. Louis Pass, 2.vii.1966; 28°45'N, 95°34'W, about 41 km SW of Freeport, 1.viii.1966; 25°55'N, 96°45'W, off Brownsville, 19.xii.1966: Chávez (1967: 4; 1968: 15-16; 1969: 33, repr.: (8)).

MEXICO

4 miles N of Nautla, Veracruz, 25.vii.1955, one hatchling; purchased in Alvarado, 22.vii.1955, three hatchlings: Fugler & Webb (1957: 107), Deraniyagala (1957: E 13), Carr & Caldwell (1958: 254-259).

Further references to nesting and/or hatchlings: Carr & Caldwell (1958: 247, fig. 5, Alvarado), Carr (1961a: 10-12, 1961b, 1963b, fig. 2; 1967c, 1968: 129; 1970: 22), H. H. Hildebrand (1963: 107, fig. 1), Caldwell (1966: 12-13), [Montoya] (1966: 33), Montoya (1969: 35), Anonymus (1966b; 1969), Adams (1966), Chávez (1967; 1968), Chávez, Contreras & Hernandez (1967; 1968), Marquéz & Contreras (1969), Pritchard (1969a: 17; 1969c: 14). The major nesting beaches are found in the vicinity of Rancho Nueva (from Boca San Vicente to Barra Coma, Tamaulipas), a more limited nesting takes place in Texas (q.v.) and further southwards in Veracruz (Nautla; Alvarado).

Further locality records:

Veracruz: 11 km off Barra de Alvarado, 26.viii.1961: Chávez (1967: 4-5; 1968: 15; 1969: 33; repr.: (8)).

Tabasco: off Barra 'Dos Bocas', Puerto Ceiba, 8.viii.1966: Chávez (1967: 4; 1968: 14; 1969: 33, repr.: (7)).

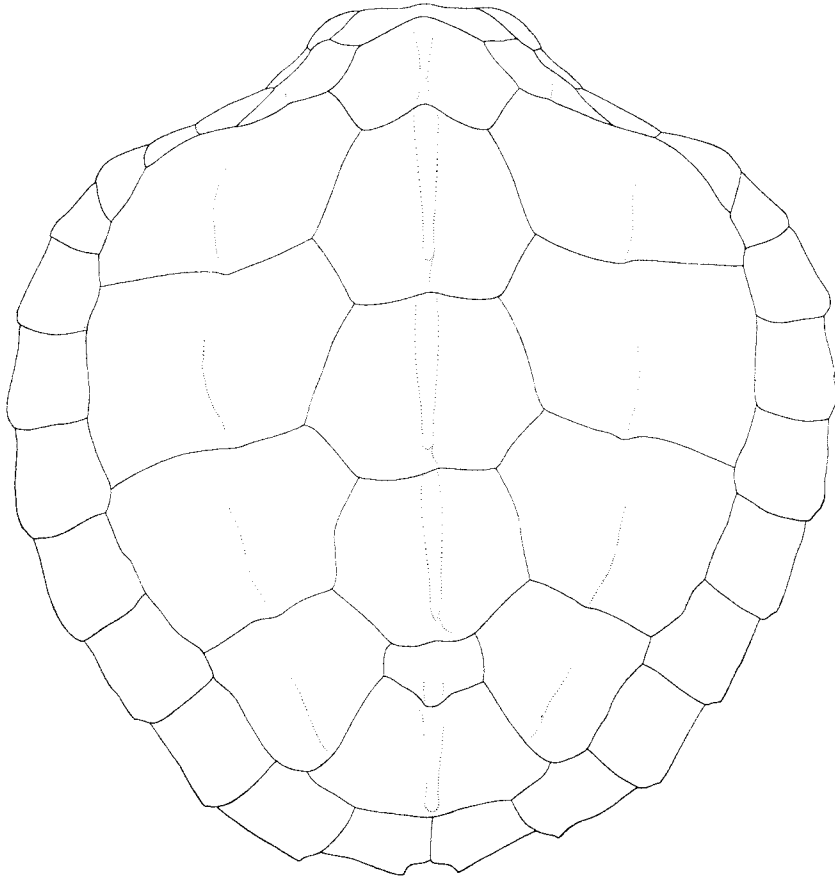


Fig. 30. *Lepidochelys kempi* (Garman), Corvo, Azores, Mus. Océanogr. Monaco 2660; carapace, long 99.7 mm.

Campeche: Campeche, leg. Ferrari-Pérez, MNHNP 90.146: Brongersma (1968*h*: 440); Barra de San Pedro, 8.vii.1967; 15 km off Barra de Isla Aguada, 5.viii.1967; 6 km off Isla Aguada, 10.iii.1967; between Isla Aguada and Barra Bajamita, 8.viii.1967; between Isla Aguada and Ciudad del Carmen, 18.vii.1966; vicinity of Ciudad del Carmen, 18.viii.1966: Chávez (1967: 4-5; 1968: 14-16; 1969: 33, reprint: (8)).

Quintana Roo: Isla de Mujeres: H. M. Smith & Taylor (1950: 15).

BERMUDA

Babcock (1937*a*: 49; 1937*b*: 595 *Caretta kempi(i)*), when enquiring about Kemp's Ridley in Bermuda learned that on rare occasions fishermen took what they called a "Mullatto Turtle", and which may have been *Lepidochelys*

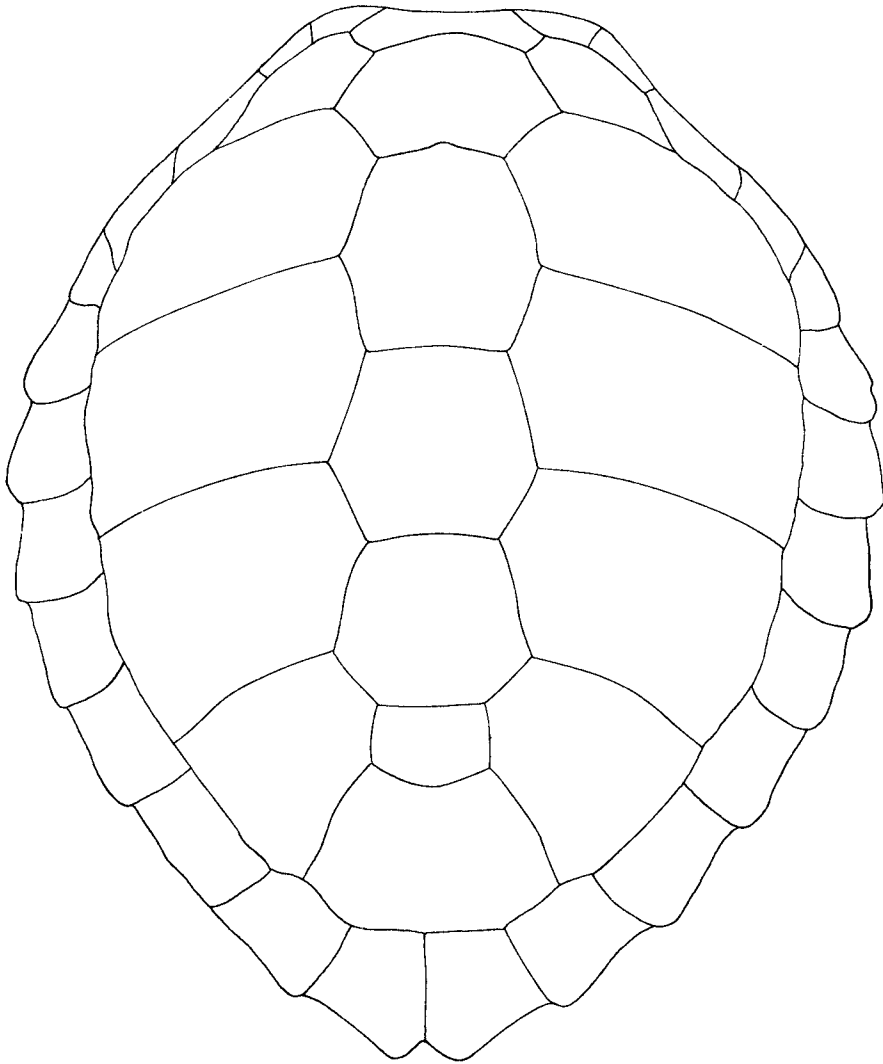


Fig. 31. *Lepidochelys kempii* (Garman), Madeira, SMF 41057; carapace, long 299.5 mm. *kempii*. Proof of its occasional presence in the waters around Bermuda was brought by Mowbray & Caldwell (1958: 147).

AZORES

Corvo, Azores, 1913, leg. Col. F. A. Chaves, Mus. Monaco no. 2660.
Deraniyagala (1938*b*: 540; 1939*a*: 1; 1939*b*: 156; 1943: 82).
Length of carapace 99.7 mm, width 98.7 mm (fig. 30).

MADEIRA

Off Madeira, summer 1949, purchased at the fish market of Funchal, Mus. Funchal 3978; off Madeira; summer 1950, purchased at the fish market of Funchal, Mus. Funchal 3194; off south coast of Madeira, v.1950, received from Funchal Museum, Senckenberg Museum 41057 (fig. 31).

Brongersma (1968c: 133; 1968b: 439).

MEDITERRANEAN

Carr (1957: 48; 1963b: fig. 2; 1967c, 1968: 148) is of the opinion that a young turtle from Malta, with the carapace barely $1\frac{1}{4}$ ft. (38 cm) long, recorded by Despott (1930a, b) as having been *Chelone mydas*, in reality was a specimen of *Lepidochelys kempii*. In a previous paper I have suggested that the specimen might have been one of *Caretta caretta* (Brongersma, 1961: 4). As I am one of the European zoologists, who does not yet agree with Carr's identification of this specimen (Carr, 1967c, 1968: 148), and perhaps the only one (Mertens, 1968b: 12, accepts Carr's identification of the genus, and he considers it probable that the species is *kempii*: "*Lepidochelys* (waarschijnlijk) *kempii*"), I may argue my case once more. Despott (1930a, b) gave two figures of this turtle, one showing it in ventral view, and one in dorsal view. From the dorsal view the following information can be obtained: the turtle has five vertebrals and five pairs of costal scutes; the nuchal is in contact with the first costal on each side. These features show that the turtle was not a Green Turtle, but that it could be either a Loggerhead or a Kemp's Ridley. From the photograph of the dorsal view one gets the impression that the carapace is about as wide as long, and this would point to its being Kemp's Ridley. However, when one compares the photograph of the dorsal view with that of the ventral view, it becomes clear that the dorsal view was taken from a turtle of which the carapace had been tilted over backwards; in this way the carapace was foreshortened in the figure, and thus it appears to be relatively wider than it really is. The figure of the ventral view distinctly shows the turtle to have four inframarginals on the left side; the situation on the right side is not very clear in the figure, but it seems as if there too four inframarginals are present. In the past it was believed that the presence of four inframarginals was considered a distinctive feature of the genus *Lepidochelys*, the genus *Caretta* having but three inframarginals on each side. However, repeatedly it has been demonstrated that *Caretta caretta* may have four or more inframarginals, be it on one side only, or on both sides (H. W. Parker, 1939c: 157; Carr, 1952: 394; Willgoos, 1953b: 3, fig. 6; Baldwin & Lofton, in: Caldwell,

1959a: 343; Brongersma, 1961: 3-4, table I; E. K. Barth, 1964: 11-12; Capocaccia, 1966: 14-15; Hughes, Bass & Mentis, 1967: 36; Hughes, 1970: 24). *Lepidochelys kempii* also shows some variability in the number of inframarginals, but there is no doubt about four inframarginals being the most common count (Chávez, Contreras & Hernández, 1967: 16; Pritchard, 1969a: 64). To the few specimens of *L. kempii* with three inframarginals recorded as such in literature, may be added, a specimen from Boston Harbour, Massachusetts, 1942 (MCZ 46537), and one from Tortugas, Florida (April 14th, 1955; MCZ 1406). In the last named specimen, the third inframarginal on the left side is partly divided by an incisure starting from a marginal; on the right a fourth scute is present but it does not reach the femoral, and hence it is not a true inframarginal. Be this as it may, a count of four inframarginals alone is not sufficient to refer the Malta turtle to *L. kempii*; with this count it can just as well be a specimen of *C. caretta*. To-day, like in 1961, I see no single character that would exclude the possibility of the Maltese turtle having been anything else than a Kemp's Ridley, and I consider it more likely that it was a Loggerhead. After all large numbers of Loggerheads used to be taken in the Maltese Islands in the months of August to November (Despott's specimen was captured on October 29th, 1929), and the Loggerhead used to come to the island of Gozo to lay eggs (Despott, 1915: 327)¹⁰; the species still breeds in Sardinia, Sicily, on the coast of the Italian mainland, and on the coast of Libya (Bruno, 1969: 13). The discussion about the Maltese specimen, which became lost during the second world war, is largely academic. It is well possible, of course, that *L. kempii* occasionally does pass through the Straits of Gibraltar to enter the Mediterranean, and that one day the proof of this will be given.

APPENDIX 2

References to West-Atlantic records of *Lepidochelys olivacea* (Eschscholtz).

BRAZIL

Pritchard (1969a: 22, 162-163, fig. 24; 1969b: 94, fig. 3): *Lepidochelys olivacea*.

¹⁰ Prof. H. Micallef, The Royal University of Malta, wrote to me as follows (in litt., 13.iv.1968): "From the enquiries I made it results that Loggerheads used to nest on Gozo Island in the past, but that apparently they stopped doing so for these last few decades. Since the end of World War II there is hardly an angle of the Maltese Islands left which is not often frequented by picnickers, and during the last war our sandy beaches have seen a lot of intensive training by the amphibian section of the armed forces which disturbed the natural environment to a very large extent".

FRENCH GUIANA

Brongersma (1968*h*: 441), Pritchard (1969*a*: 22; 1969*b*: 120), Schulz (1971*a*: 402): *Lepidochelys olivacea*.

SURINAM

Kappler (1854*a*: 59; 1854*b*: 200): Varana.

Kappler (1881: 135; 1883: 233; 1885: 800; 1887: 122), Diemont (1941: 135): *Chelonia corticata*.

Kappler (1881: 166): *Caouana corticata*.

Brongersma (1961: 27, figs. 7*e*, 8*f*; 1968*a*: 34; 1968*b*: 125), Carr (1963*b*: fig. 2; 1967*c*, 1968: 154), Schulz (1964*a*: 8; 1967*a*: 6, 8; 1968*a*: 7, 9, 3rd plate, lower fig.; 1968*b*, 1969*a*: 3, 14, 64, figs.; 1969*b*: 20; 1971*b*: 26), Pritchard (1966*a*: 123; 1969*b*: 97; 1969*c*: 14), Janssen (1969: 23), Anonymus (1970: 32): *Lepidochelys olivacea*.

Janssen (1970: 23): *Lepidochelys olivacea*.

Schulz (1964*b*: 5, 9, 11, 20, 28, 35, figs.): *Caretta caretta*.

Schulz (1967: 2nd plate, lower fig.): Green Turtle.

References to the occurrence of *Caretta caretta* in Surinam by V[an] L[idth] d[e] J[eudel] (1914: 202, *Thalassochelys caretta*), by Schulz (1964*a*: 5), and by Somberg-Honig (1967: ii), at least in part, are based upon Kappler's 'Warana', and hence upon *Lepidochelys olivacea*.

The press (Anonymus 1967*a, b, c*) also paid attention to the nesting on Surinam beaches of *Lepidochelys olivacea*.

SEA OFF SURINAM AND OFF GUYANA

Carr (1963*b*: fig. 2), Pritchard (1966*a*: 123), Brongersma (1968*b*: 117), Caldwell, Rathjen & Hsu (1969: 4): *Lepidochelys olivacea*.

GUYANA (formerly British Guiana)

Carr (1963*b*: fig. 2), Pritchard (1964: 27; 1966*a*: 123; 1966*b*: 652; 1967: 30; 1969*a*: 22; 1969*b*: 97; 1969*c*: 15; 1969*d*: 17), Anonymus (1966*c*: 59), Brongersma (1968*a*: 34; 1968*b*: 117): *Lepidochelys olivacea*.

VENEZUELA

Donoso-Barros (1964*a*: 21; 1964*b*: 26), Flores (1966: 11; 1969: 7): *Lepidochelys kempi*.

Brongersma (1968*a*: 34; 1968*b*: 117), Pritchard (1969*a*: 22, 162, fig. 24; 1969*b*: fig. 3; 1969*c*: 15): *Lepidochelys olivacea*.

TRINIDAD

Carr (1963*b*: fig. 2; 1967*c*, 1968: 152), Pritchard (1966*a*: 123; 1969*a*: 22, 163, fig. 24), Brongersma (1968*a*: 34; 1968*b*: 117), Bacon & Maliphant (1971: 11): *Lepidochelys olivacea*.

A hatchling of *Lepidochelys olivacea*, taken on the beach at Manzanilla Bay, Trinidad, by Mr. P. Morris on August 2nd, 1969, is present in the collections of the British Museum (Natural History); length of carapace 41.3 mm; width of carapace 32.5 mm; seven costals on each side; six vertebrals; four inframarginals on each side; inframarginal pores present.

PUERTO RICO

Caldwell & Erdman (1969: 112), Caldwell, Rathjen & Hsu (1969: 4, 23), Pritchard (1969*a*: 22): *Lepidochelys olivacea*.

CUBA

Aguayo (1953: 211): *Lepidochelys olivacea kempii*.

Carr (1957: 46; 1963*b*: fig. 2; 1967*c*, 1968: 151), Pritchard (1966*a*: 123; 1969*a*: 22), Caldwell, Rathjen & Hsu (1969: 4): *Lepidochelys olivacea*.

JAMAICA?

Dunn (1918*b*: 75) refers to a skull (condylobasal length 54 mm) of a turtle that in March or April was brought alive to Port Antonio, Jamaica, and he referred it to *Caretta kempii* (i.e., *Lepidochelys kempii*). Lewis (1940: 63-64) and Grant (in: Carr, 1952: 396, 398) are of the opinion that *L. kempii* is not to be found in Jamaica. Caldwell (1961: 277) states that *Lepidochelys* is unknown to the fishermen of Jamaica. Carr (1952: 398) refers to the remarks published by Garman (1888: 9) upon a 'bastard turtle' from Jamaica. One wonders whether the turtle brought to Port Antonio (Dunn, 1918*b*: 75) could not have been a fairly young stray *L. olivacea*. It would be of interest to re-examine the skull to try and identify it with the one or the other *Lepidochelys* species.

APPENDIX 3

ENEMIES OF TURTLES

Sometimes one finds turtles in which one of the flippers is wholly or partly missing. Of one Leathery Turtle (De 94) the right hind flipper had been amputated; the wound had healed, leaving a scar. Of five Loggerheads a fore flipper or part of it, had been amputated; in Ca 17, Ca 32, and Ca 44 the right fore flipper is missing, Ca 18 had lost the left fore flipper, and in Ca 33 part of the left fore flipper is missing. Although there are statements

in literature that a turtle, of which one or two (or even three) flippers are lost, may learn to set a straight course (Travis, 1959: 168), the loss of a flipper undoubtedly is a handicap. The Loggerhead, Ca 32, the right fore flipper of which is missing, when placed in an aquarium could only swim in circles. The question may be raised how turtles come to lose a flipper.

Moorhouse (1933: 6) remarks that some hatchlings are found to lack a flipper, or to have misformed flippers at birth. The two examples mentioned by him concern a hatchling found dead on the beach, and a hatchling taken from the nest. It is extremely doubtful whether any hatchlings with such a handicap will survive for any length of time, for it is well known that sharks and other predatory fish prey on hatchling turtles when these enter the sea (e.g., Hendrickson, 1958: 521-522; Baldwin & Lofton, in: Caldwell, 1959a: 344). Caldwell, Carr & Ogren (1959: 297) mention two juvenile Loggerheads, about twelve or thirteen days old, found in the stomach of a White-tipped Shark (*Carcharinus longimanus* (Poey)), and Baldwin & Lofton (in: Caldwell, 1959a: 346) mention a young Loggerhead found in the stomach of a Black Sea Bass (*Centropristes striatus* (L.)).

However, it seems unlikely that the turtles, which have been found in European Atlantic waters and of which a flipper is missing, were born lacking the flipper. It is assumed that the amputation of flippers in young, half-grown, and adult turtles is due to the attacks of sharks or of other predators. The fact that sharks do provide a real danger even to fully grown turtles is a subject that received more attention in ichthyological than in herpetological literature. Therefore, some data taken from the whole range of distribution of turtles (Atlantic, Indian, and Pacific Oceans) may be mentioned here.

Alexander (1837: 298), in dealing with the Green Turtles found on the island of Ascension, writes: "Sharks also contrive to get hold of the old ones. Thus an enormous shark fourteen feet long was caught from the taffrail of the *Thalia* in Clarence Bay, in which was found the head of a large turtle . . .," and on p. 299: "One old female, called "Nelson," because one of her flippers had been carried off by a shark, was kept, out of respect, for two or three years in the ponds."

Garman (1884: 297) writes: "In the stomach of a shark, which the kindness of Lieut.-S. M. Ackley, U.S.N., enabled me to examine, a 10-pound Green Turtle was found. The shell was too hard for the shark's teeth, and was scored all over by the efforts of the "man-eater" to divide it. Discouraged in his attempts he had at last swallowed it entire."

Baird (1889: 44) includes turtles in the diet of the Tiger Shark (*Galeocerdo tigrinus* = *G. cuvier*).

Coles (1915: 91; 1919: 37) describes a White Shark (*Carcharodon carcharias* (L.)) attacking a large Loggerhead in the Bight of Cape Lookout, North Carolina. Such as Coles describes the event, the shark was starting an attack on Coles's skiff, when the Loggerhead came to the surface, just in the line of attack. The turtle was seized by the shark, and the two disappeared under water. The next day Coles harpooned a turtle, of which he assumes that it is the same specimen. The edge of the shell and the right hind flipper had been torn away; for a width of nearly thirty inches the carapace showed the marks of the shark's teeth (Coles, 1915: 91). In the second version Coles (1919: 37) mentions hearing the jaws crushing through the shell of the turtle. There are slight differences between the two versions. In the first account Coles places the event in 1905, the shark is stated to have been more than twenty feet long, and it started its attack on the skiff from a distance of several hundred yards. In the second account the event took place in 1903, the shark is said to have been eighteen feet long, and it started the attack from a distance of approximating a hundred yards.

Roosevelt (1917: 290-291) refers to the attacks of sharks on turtles in Florida waters. These remarks are based upon verbal communications by R. J. Coles and by local fishermen, who assured him that nearly half of the Loggerheads captured by them showed signs of having been attacked by sharks. "Usually this meant that one flipper was gone. In one case the turtle had lost two flippers, obviously at different times". On one occasion a very large shark was found with a huge Loggerhead in its mouth, "the turtle frantically waving all four legs while the shark shook its head in the effort to get its teeth through the shell."

Coles (1919: 40) mentions having found a freshly-eaten Loggerhead, approximately 100 lb. in weight, in the stomach of a Tiger Shark (*Galeocерdo tigrinus* = *G. cuvier* (Lesueur)) in North Carolina waters. The turtle had been bitten through both shells in three places; the pieces of shell were much crushed, but all parts of the turtle were present.

Larcher (1916: 251) remarks that sharks are present when the males of *Thalassochelys caretta* (= *Caretta caretta*) fight one another at mating time; the sharks profit from the weakness of the vanquished turtle, and devour it.

J. C. Bell & Nichols (1921: 18-19) also dealt with the food of the Tiger Shark (*Galeocерdo tigrinus* = *G. cuvier*) in Carolina waters. In the stomach of seven of these sharks remains of turtles were found: (1) parts of a sea turtle; (2) some pieces of turtle; (3) pieces of sea turtle; (4) a large amount of turtle shell and two jaws of a Loggerhead (p. 18); (5) partly digested turtle meat, and part of the shell of a sea turtle; (6) a Loggerhead intact; (7) parts of a Loggerhead (p. 19). These authors (1921: 19) also state

that several Loggerheads, some badly mutilated, were caught in the same net as the sharks.

A freshly eaten Loggerhead of approximately 100 lb (appr. 50 kg) was found in the stomach of a Tiger Shark (Nichols, 1921: 274). The same author (p. 274) adds that thirty Tiger Sharks were examined by a Mr. Bell, who found that the prey consisted for 76 per cent of large creatures, i.e. of turtles; several Tiger Sharks had pieces of big turtles in their "innards" and one large female contained a Loggerhead intact. "Ordinarily loggerhead turtles and valuable food fish are probably consumed in quantity."

Hardenberg (1929: 145) when dealing with sharks from the Indo-Australian area states that fairly regularly remains of turtles were found in the stomach contents

Deraniyagala (1930: 65), when dealing with the turtles of Ceylon, remarks that sharks not infrequently amputate a limb.

Moorhouse (1933: 6), in his report on the Green Turtle of Heron Island (Great Barrier Reef), writes: "Sharks appear to cause much damage, and animals have been seen with a large piece bitten out of the carapace and with flippers missing; probably the result of shark attacks. One female in particular had her flippers so badly mutilated that she could not clamber up the beach."

Banks (1937: 525) refers to "the loss of a flipper to a shark" as one of the marks by which certain female turtles can be recognized when they come ashore to lay various times.

Norman & Fraser (1937, 1948: 15; 1963: 35/36) quote the 1915 version of Coles's story of a Man-eater attacking a Loggerhead. These authors (1937, 1948: 42; 1963: 57) mention turtles among the items of the Tiger Shark's diet.

Beebe & Tee-Van (1941: 113) found a complete Green Turtle (*Chelone mydas* = *Chelonia mydas*), 760 mm long and full of eggs, in the stomach of a Tiger Shark (*Galeocerdo arcticus* = *G. curvier*) from the eastern Pacific. The fact that the turtle was full of eggs, and hence fully adult, makes it likely that the length given is that of the carapace.

Sarangdhar (1943: 103-104) also mentions "a turtle (*Chelone mydas*), wholly intact" found in the stomach of a Tiger Shark (*Galeocerdo tigrinus* = *G. curvier*) caught in Bombay waters.

Budker (1947: 96) mentions turtles as forming part of the diet of sharks; on p. 98 this author mentions large pieces of a turtle having been found in the stomach of a Tiger Shark (*Galeocerdo arcticus* = *G. curvier*), and also that large pieces of a Loggerhead (*Thalassochelys caretta* = *Caretta caretta*) have been found in a Tiger Shark. No information is given as to the source from which Budker obtained these data.

Gudger (1948a: 230-231) does not add any new data. Gudger (1948b: 282) adds one new record: Max Nicholls (1947: 36) found a turtle in the stomach of a Tiger Shark (*Galeocerdo cuvier*) caught near Lord Howe Island.

Bigelow & Schroeder (1948: 68) state that turtles are a regular item in the diet of some sharks. With regard to the White Shark (*Carcharodon carcharias* (L.)) they state (p. 139): "Sea turtles are also described as a regular item in its diet in southern waters", and with regard to the Tiger Shark (*Galeocerdo cuvier*, p. 270): "a Tiger Shark has no difficulty in cutting through the shell of a sea turtle."

Gudger (1949) deals with the food of Tiger Sharks (*Galeocerdo tigrinus* = *G. cuvier*) at Key West, Florida. Turtle remains were found in the stomach of five turtles: (1) fragments of Green Turtle shell (p. 40); (2) some turtle scutes; (3) some plates of the shell of a Green Turtle; the upper and lower horny jaws of a turtle (p. 41); (4) several Green Turtle scutes; (5) Loggerhead and Green Turtle scutes, 13 turtle egg shells (p. 42).

Ingle & Smith (1949: 22) in dealing with the Green Turtle, write: "Reports from various sources indicate that sharks may mutilate adult turtles and even dispose of entire animals up to 50 lbs. . . . Upon entering the water various fish, including sharks, feed upon the young turtles", and about the Hawksbill (p. 23): "Enemies are the predators which attack the young of Green Turtles."

Bigelow & Schroeder (1953: 38) remark that *Galeocerdo cuvier* preys upon the large sea turtles.

Sumarto (1955: 61, 62), in dealing with the stomach contents of *Galeocerdo rayneri* (= *G. cuvier*) in Indonesian waters, states that remains of turtles (*Chelonia* sp.) have been found.

Cadenat (1957a: 276) remarks that turtles (*Chelonia*, *Caretta*, and *Eretmochelys*), either entire or in pieces, are frequently found in the stomach of Tiger Sharks (*Galeocerdo arcticus* = *G. cuvier*) in West African waters.

Hendrickson (1958: 521-523, pls. 8c, 9a, b) dealt more extensively with the danger that sharks provide to turtles. Small sharks (40-60 cm in length) at night lie in wait for hatchlings in shallow water (15 cm deep). It is estimated that four per cent of the adult females examined on nesting beaches in Malaya and in Sarawak showed signs of assumed shark damage. Some specimens (carapace length of over 90 cm) showed fresh wounds, indicating that the sharks also attack fully adult females. Most damage was done to the hind flippers and to the pygal area. On plate 8c, Hendrickson shows a female Green Turtle of which the left hind flipper has been amputated, and of which the pygal area of the carapace is damaged. Two Tiger Sharks (*Galeocerdo* sp.) caught off the Talang Talang Islands, Sarawak,

contained turtle remains. In plate 9a, b the stomach contents of one of these Tiger Sharks are shown, including remains of the Olive Ridley (*Lepidochelys olivacea*, head and jaws) and of the Green Turtle (*Chelonia mydas*, part of the head of one specimen, jaws of another, larger specimen), and also remains of fore and hind flippers of these turtles.

Villiers (1958: 53) states that Cadenat found four heads of *Eretmochelys imbricata* in the stomach of a Tiger Shark.

Caldwell (1959a: 344): "Some references indicate that sharks also destroy the adults" of Loggerheads.

Travis (1959: 168-169) comments on the large numbers of turtles he saw at Aldabra that were missing a flipper, usually one of the hind ones. He believes that these almost certainly have been bitten off by sharks, which are said to prefer turtle meat to all other.

Bonham (1960: 257) examined the stomach contents of a Tiger Shark (*Galeocerdo cuvier*) from Rongelap Atoll, Marshall Islands: "The beak, claw, and scute remains of a sea turtle fell from the everted stomach of the shark as it was hoisted by the tail."

Parsons (1962: 50-51) mentions the remarks by Travis (1959; see above); he also refers (1962: 62) to sharks and other fish preying on hatchling turtles in Sarawak. Furthermore, Parsons (1962: 80) refers to remarks made by Colnett (1798: 133), who attributed the absence of turtles at Cocos Island to the great numbers of sharks that infested its waters.

Randall (1963: 346) mentions turtles as forming part of the diet of *Galeocerdo cuvieri* (= *G. cuvier*) in the West Atlantic: "Its serrate teeth are efficiently used to cut pieces from large sea turtles."

Springer (1963: 109) mentions "pieces of large sea turtles" having been found in Tiger Sharks. Dealing with the Ridge-Back Sharks (*Carcharinus*) from the Florida-Caribbean area, Springer (1963: 112) remarks: "But the larger dusky sharks i.e., *Carcharinus obscurus*, weighing more than 400 pounds, frequently were found to have turtle remains in their stomach."

Stead (1963: 59), referring to Australian seas, writes: "In the tropical waters they capture large numbers of even full-grown (edible) turtles, up to 2 feet 6 inches in diameter of shell. The total amount of destruction of these turtles by the Tiger Shark must be very great indeed. In many places where considerable numbers of this shark are taken — as in parts of Oceania and Indonesia — during the breeding season of the turtles almost every large shark contains one or more turtles!"

To these data from literature the following record may be added. From a female Tiger Shark, 316 cm long, caught north of the Maroni River

(Surinam, 3/4.xii.1969, Station 911 of R/V "Calamar" of U. N. Fish. Devel. Project, 8 fathoms, received from Ir. H. Lionarons, through the intermediary of Dr. J. P. Schulz), the skull of an Olive Ridley (*Lepidochelys olivacea* (Eschscholtz)) was taken. The greatest length of this skull (RMNH 16918) is 157.5 mm; the condylobasal length could not be ascertained, as the basioccipital bone with the condyle was missing.

Besides Sharks, other marine predators may attack turtles. Palm (1947: 25) remarks that the teeth of the Killer Whale, *Orcinus orca* (L.), are so strong that they can crack the shell of the largest turtles. Slijper (1958: 226) also includes turtles in the diet of the Killer Whale, but as he informed me, he did not dispose of definite records. R. Barth (1962: 411-412, pl. figs. 3, 4, 5) describes an adult female of *Chelonia mydas* taken at the island of Trindade in the South Atlantic Ocean (20°30'S, 29°20'W) of which the right hind flipper had been amputated five centimetres below the knee joint, and of which part of the carapace (posterior marginals, part of the fifth vertebral and part of the left fourth costal scute) had been bitten off. The damaged posterior of the carapace shows a semicircular indentation and this points to the turtle having been attacked by a large predator with conical teeth. Barth mentions the Sperm Whale (*Physeter macrocephalus* L.) to be abundant in the area; the Killer Whale (*Orcinus orca* (L.)) he observed only once between Rio de Janeiro and the island of Trinidad. To me it seems more likely that a Killer Whale, which has strong teeth in the upper and lower jaws, has caused the damage than that a Sperm Whale with very small upper teeth (often covered by the gums) would be responsible. That indeed Killer Whales do attack turtles was recently shown by Caldwell & Caldwell (1969: 636) who recorded the finding of remains of a *Dermochelys coriacea* in the stomach of three Killer Whales captured off the leeward side of the island of St. Vincent in the Lesser Antilles.

EXPLANATION OF THE PLATES

Plate 1. *Dermochelys coriacea* (L.), dorsal view.

Plate 2. *Dermochelys coriacea* (L.), ♀, The Lizard, Cornwall, De 49 bis, dorsal view; an oval perforation is visible in the right fore flipper.

Plate 3. *Dermochelys coriacea* (L.), ♀, The Lizard, Cornwall, De 49 bis, posterior part of carapace and the tail, lateral view; the tubercles on the ridges of the carapace are shown; the relatively short tail extends hardly beyond the posterior tip of the carapace.

Plate 4. *Dermochelys coriacea* (L.).

Fig. 1, ♂, High Island, Co. Cork, De 63 bis, lateral view, showing the colour pattern and the long tail, which extends well beyond the posterior tip of the carapace.

Fig. 2, ♀. The Lizard, Cornwall, De 49 bis, lateral view of head and neck, showing colour pattern; at the right a number of barnacles *Stomatolepas elegans* (Costa) are present at the base of the left fore flipper.

Plate 5. *Dermochelys coriacea* (L.), ♀, The Lizard, Cornwall, De 49 bis, ventral view.

Plate 6. *Dermochelys coriacea* (L.), Inishgallon, De 63; this turtle was originally reported in the press to have been a Green Turtle; photograph received from Mr. A. P. Huet, Dublin (who stands in the background, with cigarette).

Plate 7. *Caretta caretta* (L.), Noordwijk, Ca 56, RMNH 10674.

Plate 8. *Caretta caretta* (L.), Porthloo Beach, St. Mary's, Isles of Scilly; Ca 26, photograph by F. E. Gibson.

Plate 9. *Caretta caretta* (L.), Perranporth, Cornwall, Ca 22; fig. 1, lateral view showing the keels on the vertebrae; fig. 2, part of the first, and the second vertebral enlarged, to show the knob-like process at the end of the keels.

Plate 10. *Lepidochelys kempii* (Garman), Scharendijke, Le 23. RMNH 10676.

Plate 11. *Chelonia mydas* (L.), Bahamas, RMNH 9394.

Plate 12. *Eretmochelys imbricata* (L.), Bahamas, RMNH 9395.

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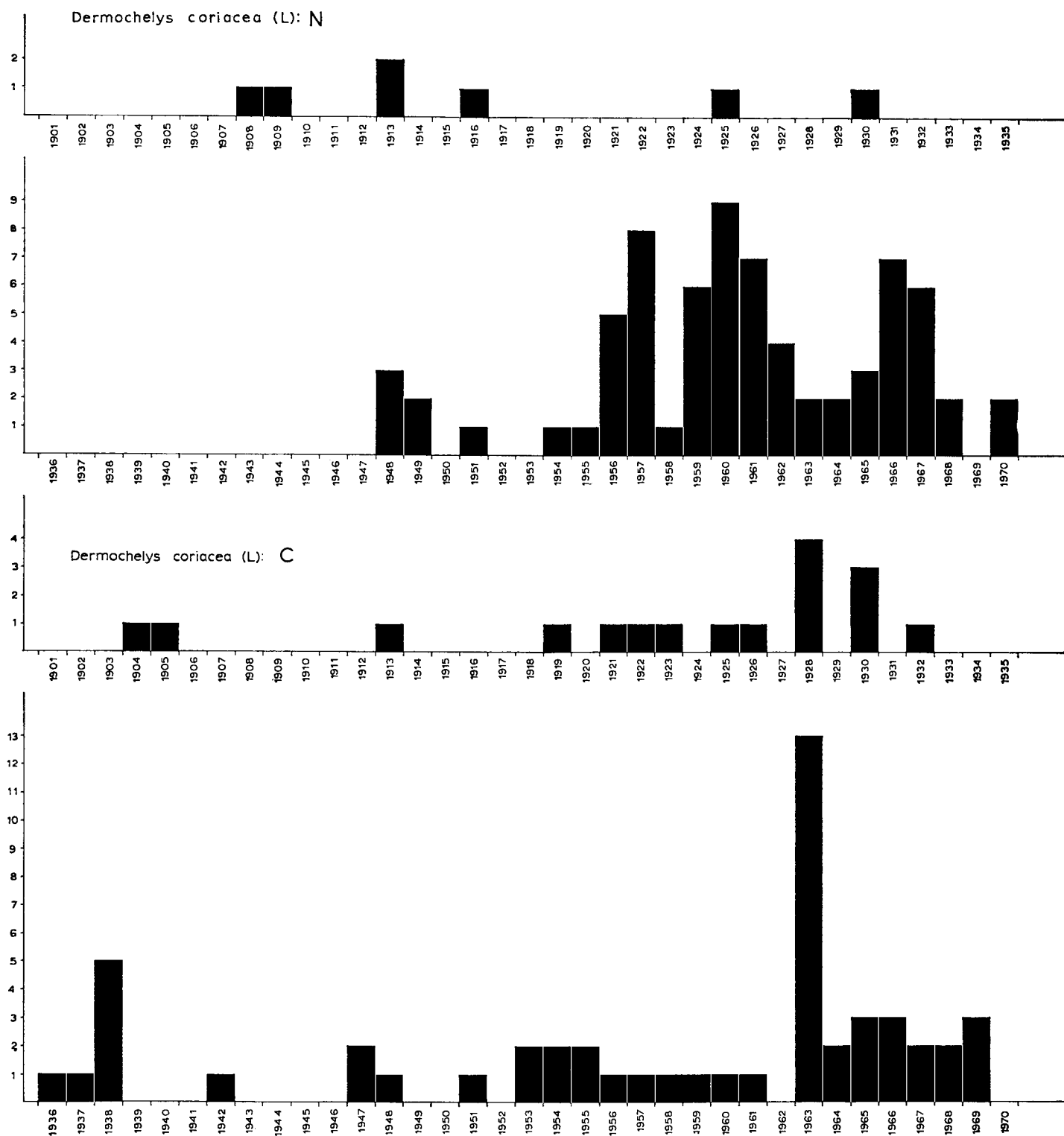


Fig. 32. *Dermochelys coriacea* (L.), numbers of records per year, in the period 1901-1970;
N, northern area; C, central area.

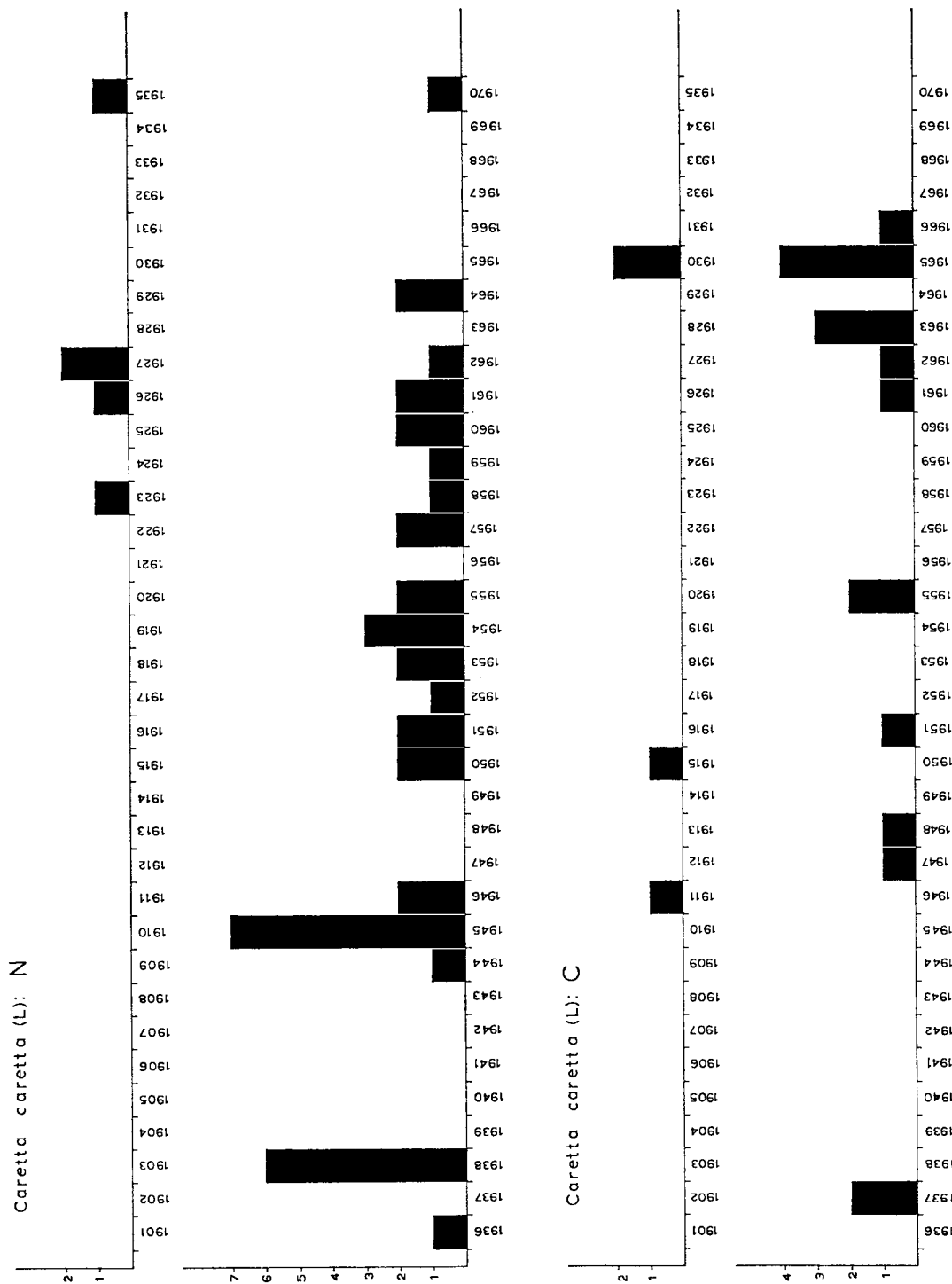


Fig. 33. *Caretta caretta* (L.), numbers of records per year, in the period 1901-1970; N, northern area; C, central area.

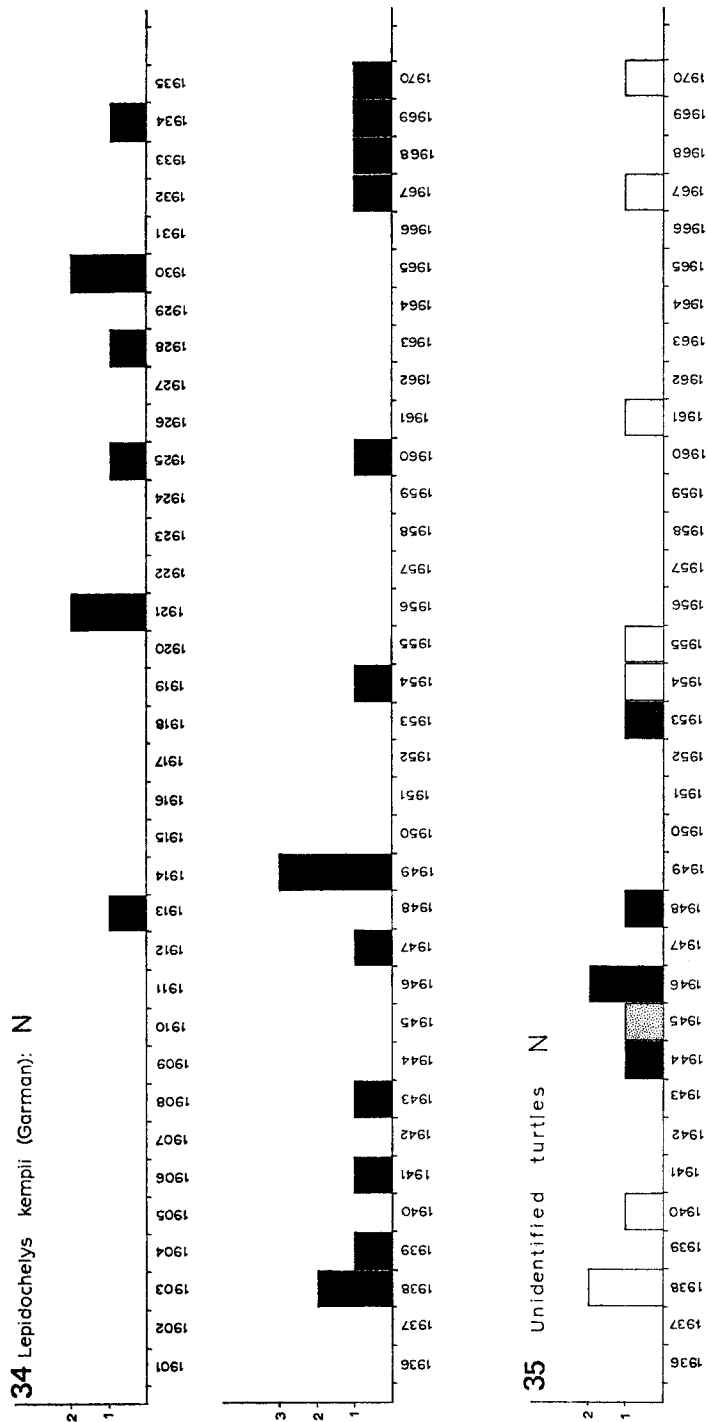


Fig. 34. *Lepidochelys kempii* (Garman), number of records per year, northern area, in the period 1901-1970.

Fig. 35. Unidentified turtles, number of records per year, northern area, in the period 1936-1970; white: Un; black: Ue; dotted: Uca.

36 *Dermochelys coriacea* (L): N
Alive

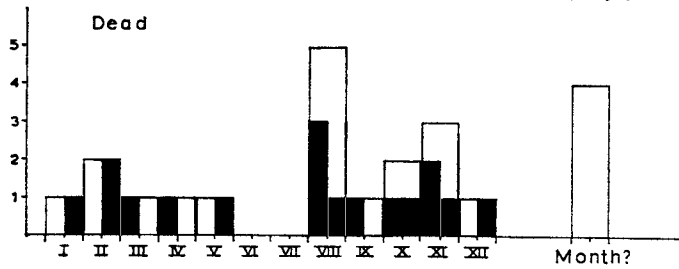
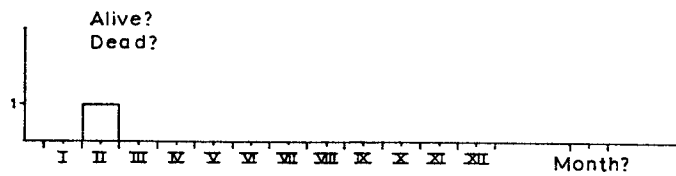
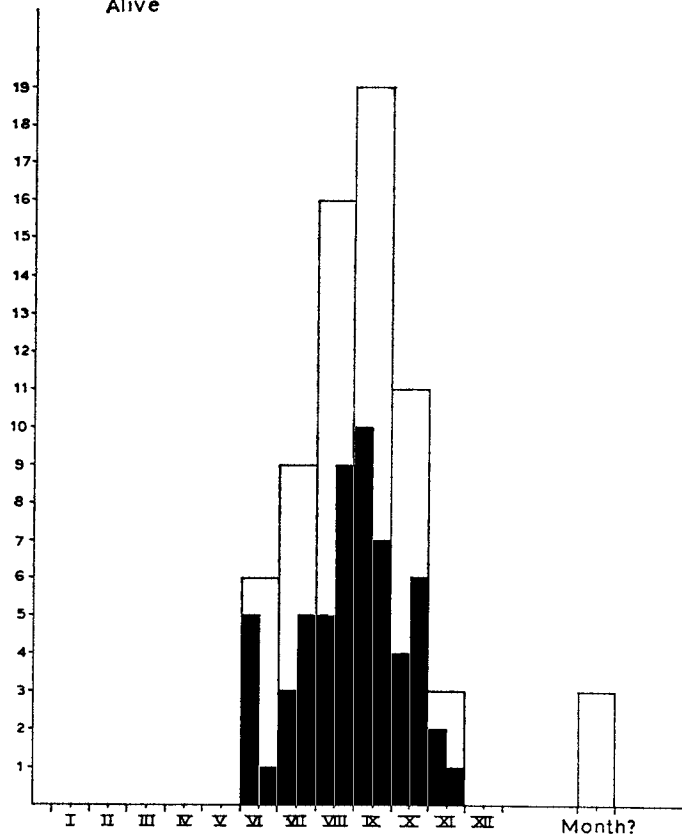


Fig. 36. *Dermochelys coriacea* (L.), number of records per month, northern area.

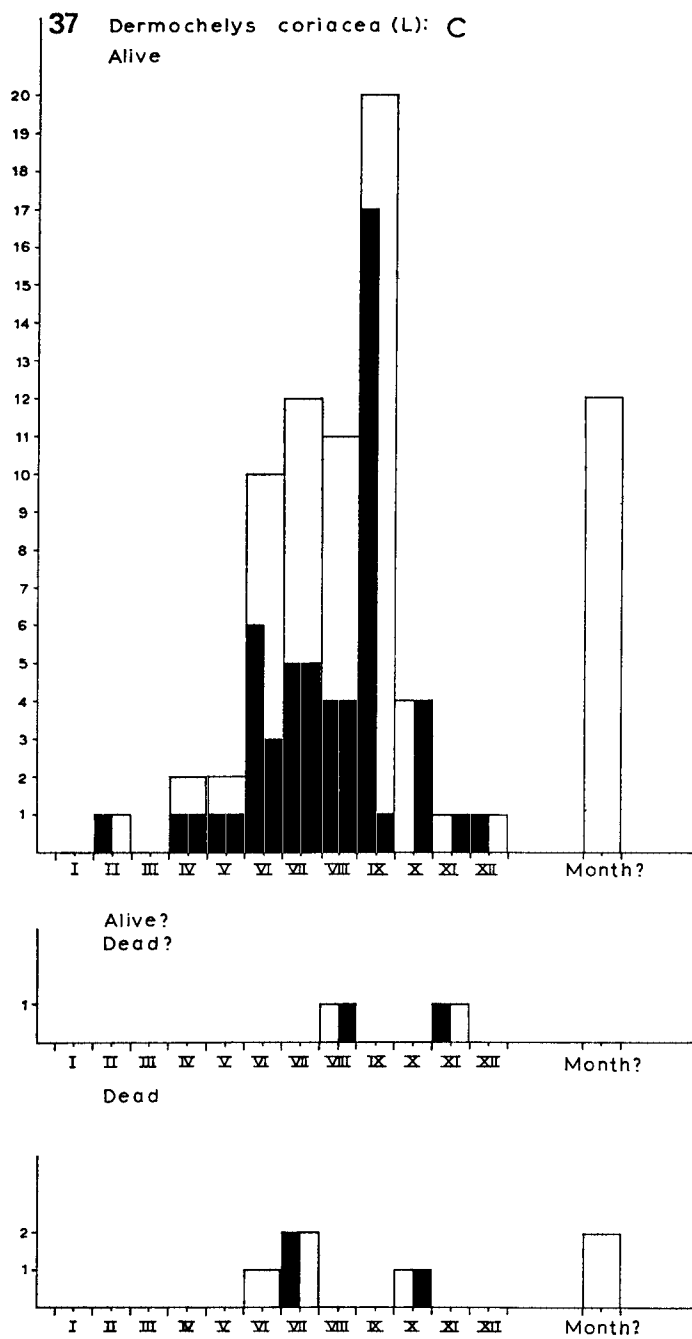


Fig. 37. *Dermochelys coriacea* (L.), number of records per month, central area.

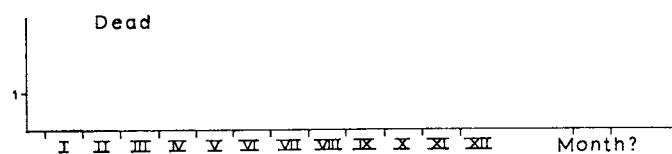
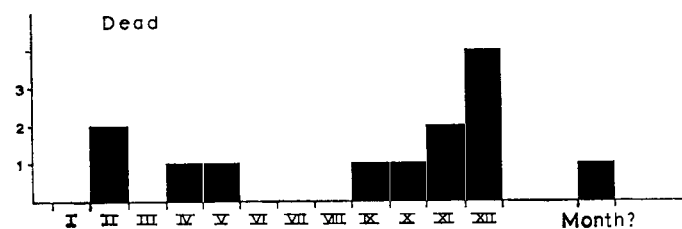
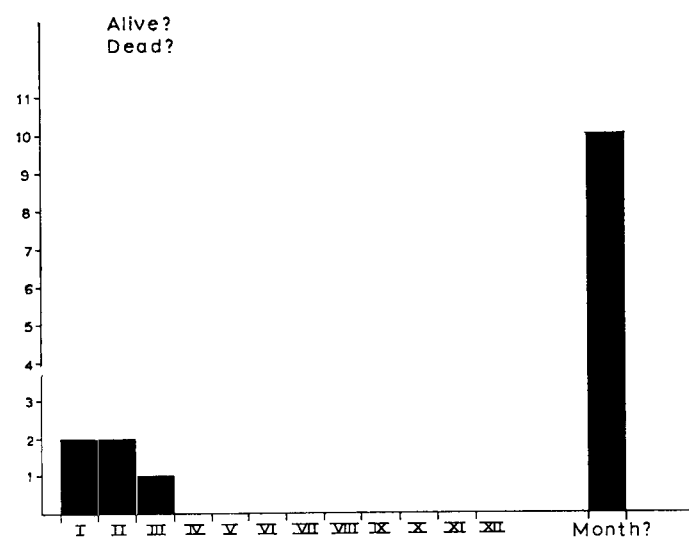
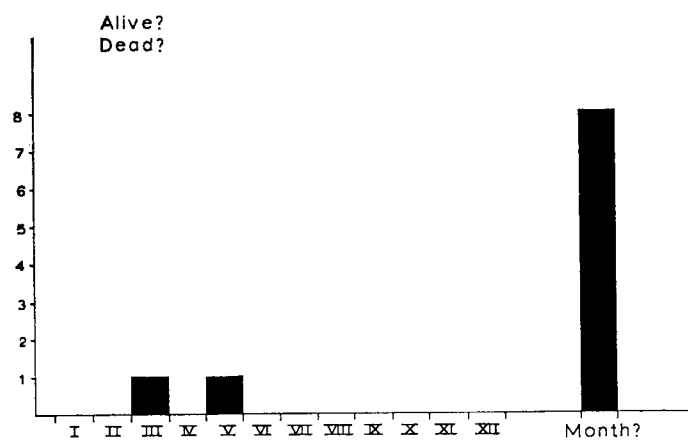
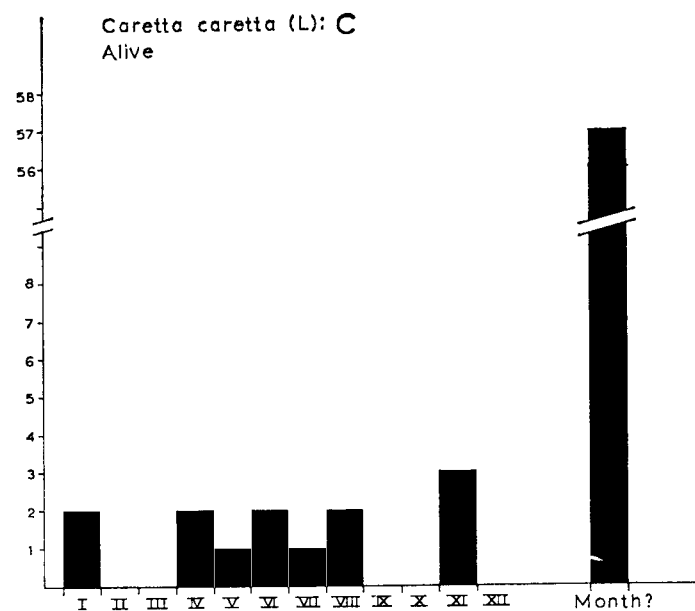
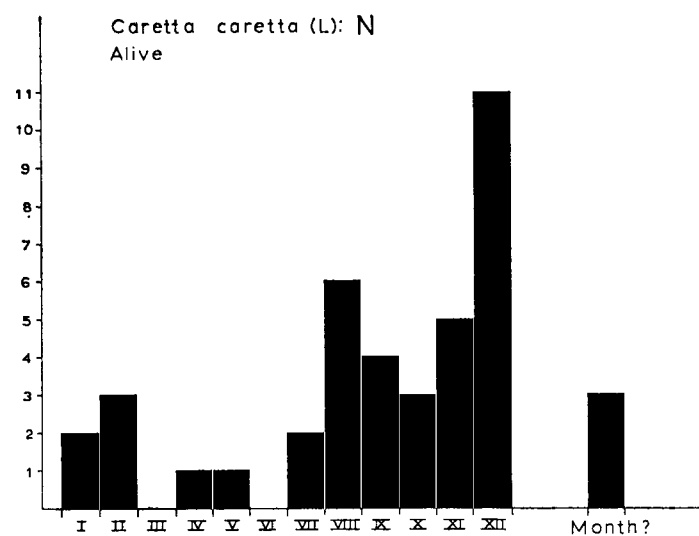


Fig. 38. *Caretta caretta* (L.), number of records per month; N, northern area; C, central area.

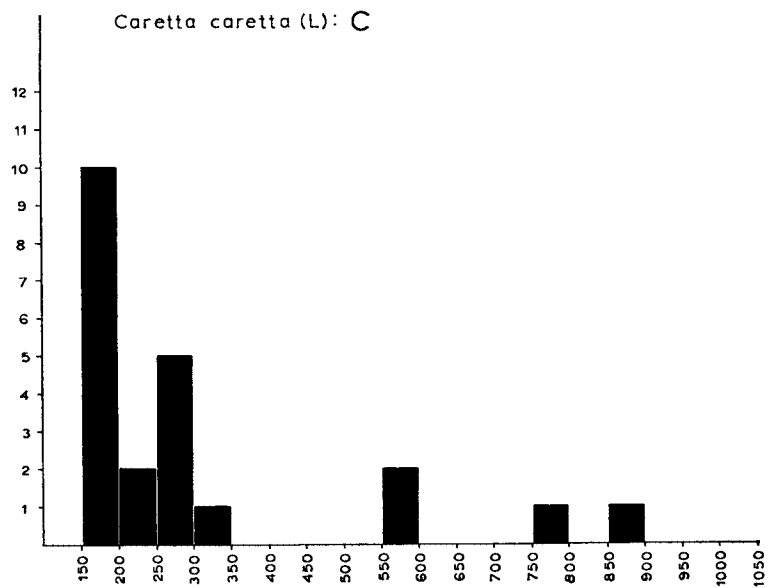
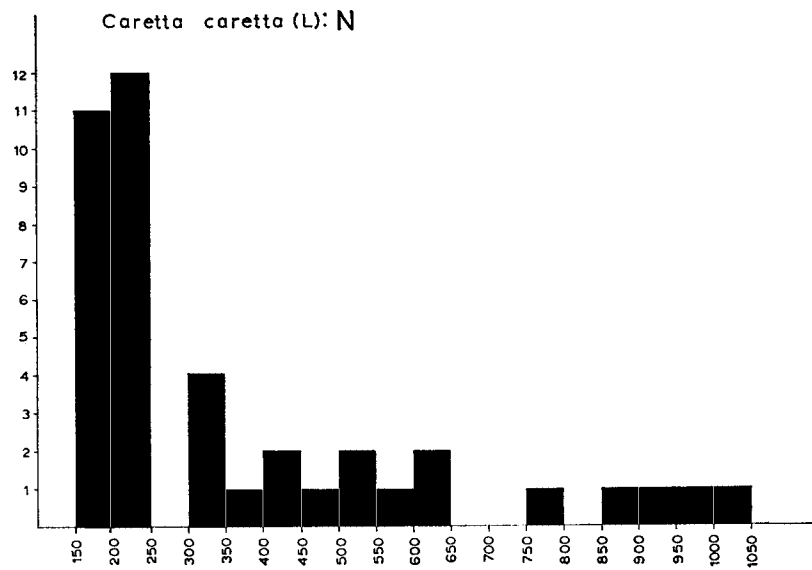


Fig. 39. *Caretta caretta* (L.), length of carapace; size groups of 50 mm range; N, northern area; C, central area.

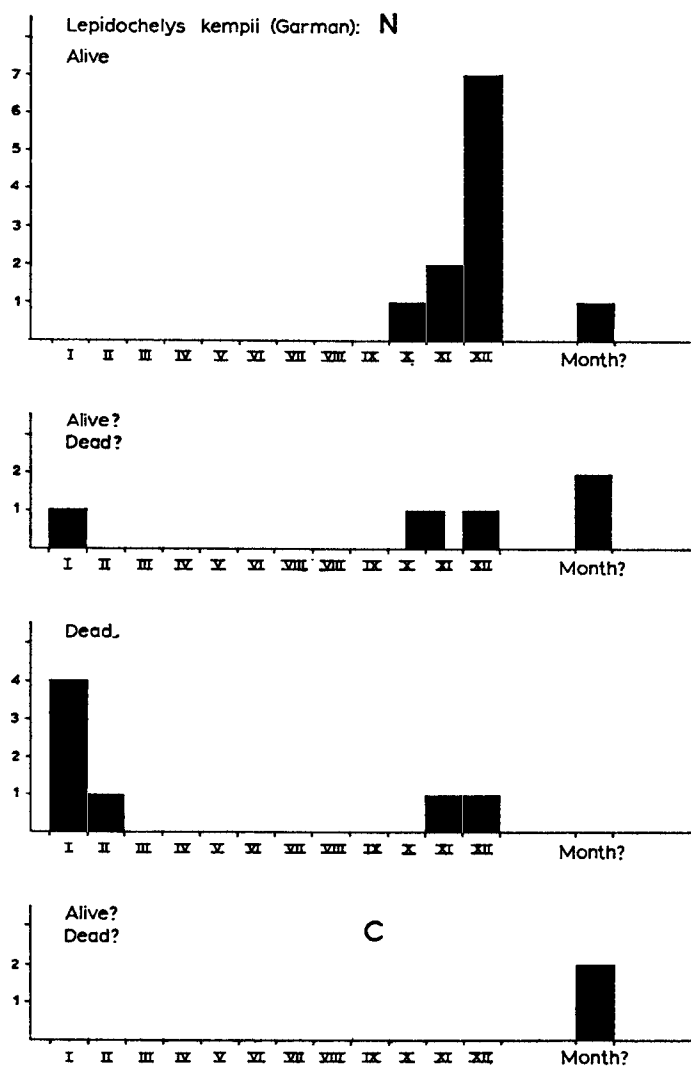


Fig. 40. *Lepidochelys kempii* (Garman), number of records per month; N, northern area; C, central area.

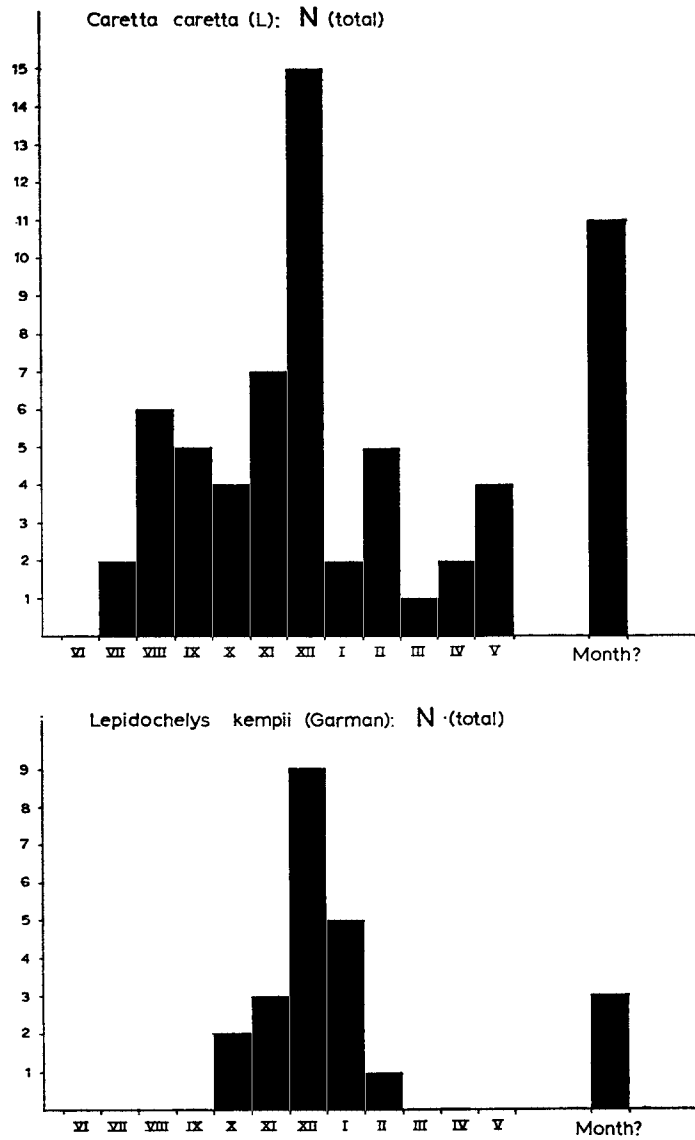


Fig. 41. Total numbers of records per month (alive and dead taken together) in the northern area of *Caretta caretta* (L.) and *Lepidochelys kempii* (Garman).

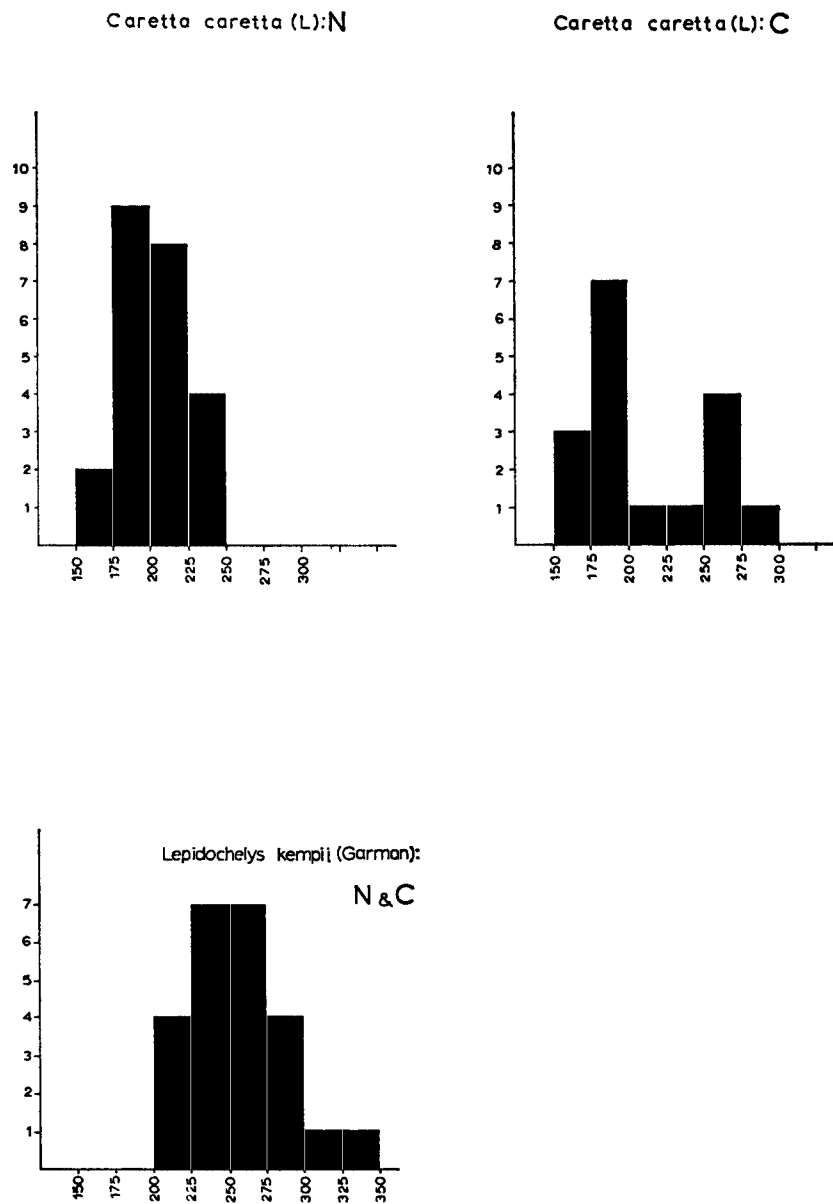


Fig. 42. *Caretta caretta* (L.) and *Lepidochelys kempii* (Garman), length of carapace in size classes of 25 mm; specimens with the carapace between 150 and 350 mm long.

Table 1; Numbers of records, per species and per country, or area

	Table 1a											Total per country
	De	Ud	Ca	Uca	Le	Cm	Ucm	Er	Ue	Un	Ut	
Iceland	1	-	-	-	-	-	-	-	-	-	2	3
Iceland-Faeroes	-	2	-	-	-	-	-	-	-	-	-	2
Russia	-	-	1	-	-	-	-	-	-	-	-	1
Norway	9	-	1	-	-	-	-	-	-	1	2	13
United Kingdom	59	9	39	2	15	2	1	-	12	39	3	181
Eire	7	1	14	2	6	-	-	-	-	3	-	33
Denmark	2	-	1	-	-	-	-	-	-	-	-	3
Sweden	1	-	-	-	-	-	-	-	-	-	-	1
Germany	2	-	-	-	-	-	-	-	-	1	-	3
Poland	-	-	1	-	-	-	-	-	-	-	-	1
Netherlands	3	-	4	1	2	9	1	-	-	1	-	21
Belgium	-	-	2	-	-	4	-	-	-	1	-	7
France	83	-	76	-	2	3	-	1	3	6	1	175
Spain	11	-	22	-	-	5	-	-	-	2	-	40
Portugal	10	-	28	-	-	-	-	-	-	-	-	38
Total per Species	188	12	189	5	25	23	2	1	15	54	8	522

	Table 1b											Total per country
	De	Ud	Ca	Uca	Le	Cm	Ucm	Er	Ue	Un	Ut	
United Kingdom												
Scotland	20	-	10	1	2	-	1	-	2	21	1	58
England	20	7	20	1	9	2	-	-	9	13	1	82
Wales	19	-	4	-	3	-	-	-	-	5	-	31
Channel Islands	-	2	4	-	1	-	-	-	1	-	1	9
Northern Ireland	-	-	1	-	-	-	-	-	-	-	-	1
Total per Species	59	9	39	2	15	2	1	-	12	39	3	181

	Table 1c											Total per area
	De	Ud	Ca	Uca	Le	Cm	Ucm	Er	Ue	Un	Ut	
Northern area	90	12	64	5	23	16	2	1	15	50	8	286
Central area	84	-	85	-	2	2	-	-	-	4	-	177
Southern area	14	-	40	-	-	5	-	-	-	-	-	59
Total per Species	188	12	189	5	25	23	2	1	15	54	8	522

Records following | are from the central area, and those following || from the southern area.

Year	De	Ud	Ca	Uca	Le	Cm	Ucm	Er	Ue	Un	Ut
13th century	.	.	.	.	.	.	.	.	.	G44, B46	Ch7
14th century	.	.	.	.	.	.	.	.	.	F47	.
1595	.	.	.	.	.	.	.	.	.	.	Ic1
1684	.	.	.	.	.	.	.	.	(Sc2)	.	.
1700	.	.	.	.	.	.	.	.	(Sc5)	.	.
1707	.	.	.	Ne5	.	.	.	.	.	.	.
1729	|F110.	.	.	.	.	.	.	.	.	.	.
1744	.	.	.	.	.	.	.	.	.	No1	.
1747	.	.	.	.	.	.	.	.	|Sp53, 54.	.	.
1748 or 1749	.	.	.	.	.	.	.	.	E40	.	.
1752	E76	.	.	.	.	.	.	.	.	.	.
1753	.	.	.	.	.	.	.	.	.	.	No3
1754	|F124.	.	.	.	.	.	.	.	.	.	.
1756	E48, 49	.	.	.	.	.	.	.	.	.	.
1765	|E111, 111 <u>a</u>.	.	.	.	.	.	.	.	.	.	.
1767	|E112.	.	.	.	.	.	.	.	.	.	.
1774	.	.	.	.	.	.	.	.	E3.	(Sc8)	.
1777	Ne75.	.	.	.	.	.	.	.	.	(Sc13).	.
1787	.	.	|Sp142.	.	.	.	.	.	.	.	.
1792 - 1807 ?	||Po158.	.	.	.	.	.	.	.	.	.	.
1810 or 1816	.	.	E14	.	.	.	.	.	.	.	.
1826	|E140.	.	.	.	.	.	.	.	.	.	.
1827	.	.	.	.	.	.	.	.	E4.	.	.
1828	.	.	.	.	.	.	.	.	(Sc1), F15	.	.
1829	.	.	.	.	.	.	.	.	.	Sc19.	.
1835	E50	.	P155.	.	.	.	.	.	.	.	.
1836	.	.	.	.	.	.	.	.	F14	.	.
1838	|E107	.	Ir41.	.	.	.	.	.	.	.	.
1839	.	E5	.	.	.	.	.	.	.	.	.
1840	.	.	E20	.	.	.	.	.	.	.	.
1849	||Sp151.	.	.	.	.	.	.	.	E11	Ir42.	.
1854	.	.	E35	.	.	B14	.	.	.	.	.
1856	.	.	.	.	.	B15	.	.	.	.	.
1861	.	.	Sc11, 12	Sc1	.	.	.	.	.	.	.
1866	.	.	.	.	.	.	.	.	.	E33	.
1867	.	.	.	.	.	.	.	.	F13	.	.
1869 ?	|E103.	.	.	.	.	.	.	.	.	.	.
1870	.	.	.	.	.	.	.	.	.	E38	.
1871	E56 E98, 129 Po161.	.	.	.	.	.	.	.	.	E39	.
1872	.	.	.	.	.	.	.	.	E10	.	.
1873	E57	.	Po174.	.	.	.	.	.	.	.	.
1874	.	.	.	E2.	.	.	.	.	.	.	.

Continuation Table 2

	De	Ud	Ca	Uca	Le	Cm	Ucm	Er	Ue	Un	Ut
1934	|| Po.162 . . . . .	. . . . .	. . . . .	. . . . .	Ir.16. . .	Ne3,5,6 .	Ne2 . . .	. . . . .	. . . . .	. . . . .	. . . . .
1935	. . . . .	. . . . .	Ir.44. . . . .	. . . . .	. . . . .	B.13 . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .
1936	|E132 ||Po.155. . . . .	. . . . .	E26 . . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .
1937	|E133 . . . . .	. . . . .	|Sp.146,147. . . . .	. . . . .	. . . . .	Ne.7 . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .
1938	|E134,135,136,139,141 . . . . .	. . . . .	W.17;E29,31,32,33;Ir.43 . . . . .	. . . . .	E.10;C.115. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	E31,36. . . . .	. . . . .
1939	. . . . .	. . . . .	. . . . .	. . . . .	E.14 . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .
1940	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	E37 . . . . .	. . . . .
1941	. . . . .	. . . . .	. . . . .	. . . . .	Ir.17. . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .
1942	|Sp.148 bis. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .
1943	. . . . .	E8. . . . .	. . . . .	. . . . .	E7. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .
1944	. . . . .	. . . . .	Ir.47. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	E5. . . . .	. . . . .	. . . . .
1945	. . . . .	. . . . .	Sc3;E21,23,24;NI40;Ir.48,50	Ir.3 . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .
1946	||Sp.153 . . . . .	. . . . .	Sc6;W.18 . . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	E6,7. . . . .	. . . . .	. . . . .
1947	|E93;Sp.147. . . . .	. . . . .	|Sp.144 ||151,152 . . . . .	. . . . .	E.12 . . .	. . . . .	. . . . .	. . . . .	. . . . .	Sc.18. . . . .	. . . . .
1948	E32;W35;D69;|E82. . . . .	. . . . .	|Sp.145. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	C.112. . . . .	. . . . .	. . . . .
1949	Ir.66;Sw.70 . . . . .	. . . . .	. . . . .	. . . . .	Sc.1,2;E8. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .
1950	||Sp.152 . . . . .	. . . . .	E25;C.139. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .
1951	Sc.30 |E.127. . . . .	. . . . .	No.2;Sc.10;|E.77 . . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .
1952	. . . . .	E3,4.	Sc.4 . . . . .	. . . . .	. . . . .	Ne.4 . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .
1953	|E89,117; ||Po.156. . . . .	. . . . .	E28;Ir.53; ||Sp.153. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	F	E8. . . . .	. . . . .	. . . . .
1954	E52; |E.101,108.	E7.	E34;C.136;Ne.56 . . . . .	. . . . .	Ne.23. . .	. . . . .	. . . . .	. . . . .	. . . . .	Sc.16. . . . .	. . . . .
1955	Sc.12; |E.97,130. . . . .	. . . . .	E26 bis;C.138;|E.78,79. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	Sc.21;E32. . . . .	. . . . .
1956	No.4,6,7;Sc.11;E59;|E.104. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	Sc.1 . . .	. . . . .	. . . . .	. . . . .	. . . . .
1957	No.3;Sc.26,27,28;Ir.62;E.79,80,81 |121	E.11 . . .	Ir.45,51; ||Po.172 . . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .
1958	No.2; |E.118	E.12;C.110.	E.19; ||Sp.156 . . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	Sc.17.	Sc.5
1959	No.8;Sc.14,18,20,23;Ir.63; |E.83	. . . . .	Ne.57. . . . .	. . . . .	. . . . .	||Sp.20 . . . . .	. . . . .	. . . . .	. . . . .	Sc.15,22 . . . . .	. . . . .
1960	E31;W33;37a-d,38;Ir.64,67;|E.100. . . . .	. . . . .	Sc.7;C.137. . . . .	. . . . .	W.5. . . .	. . . . .	. . . . .	. . . . .	. . . . .	Sc.9,20 ;E23;W.27 |E.52	. . . . .
1961	Sc.21,22,24;W34,39;E58;Ne.74;|E.122. . . . .	. . . . .	Sc.9;E.62, |80 . . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	Sc.11,12 . . . . .	. . . . .
1962	Sc.16,17;W40;Ir.65; ||Po.160. . . . .	. . . . .	W.15;|E.85. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	|E.51. . . . .	. . . . .
1963	Ic.1;E53;|E.106,119a-1. . . . .	. . . . .	|E.65,76,84. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	E35	Ic.2
1964	W.41;E54;|E.84,125. . . . .	. . . . .	R.1;W.16. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	Sc.7 . . . . .	. . . . .
1965	No.5;D68;G72;|E.109,114,120; ||Po.159	C.111. . .	|E.63,81,82,83; ||Po.167,168 . . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .
1966	Sc.15,25;W42a-d;E45;|E.102,123,137; ||Sp.150	E6. . . . .	|E.74. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .
1967	No.9,10;Sc.13,29;W43;E55;|E.105,126.	Ir.12. . .	. . . . .	. . . . .	E6. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	E29,34. . . . .	. . . . .
1968	Sc.19;Ne.73;|Sp.148 ter,149. . . . .	. . . . .	||Sp.157,158,159 . . . . .	. . . . .	Ir.21. . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .
1969	|E.138;Sp.147 bis,147 ter . . . . .	. . . . .	. . . . .	. . . . .	E9. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .
1970	E46;E.77 . . . . .	. . . . .	E22 . . . . .	. . . . .	Ne.22. . .	. . . . .	. . . . .	. . . . .	. . . . .	E30 . . . . .	. . . . .
1971	W32 bis;E49 bis;Ir.63 bis. . . . .	. . . . .	D54 bis . . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	Ne.45. . . . .	. . . . .
Year unknown 1)	E51; E87,128,146; Po.157,163	E9.	Ir.49,52,54;B60,61;|E.66,71,. . . . .	. . . . .	|E.24. . .	Ne.11;E.16, . . . . .	. . . . .	. . . . .	E9.	Sc.2,3,4,6,14; . . . . .	. . . . .
	. . . . .	. . . . .	72,73,75,87,88-137;Sp.138- . . . . .	. . . . .	. . . . .	|E.17,18;. . . . .	. . . . .	. . . . .	. . . . .	W.24,25,28;Ir.41, . . . . .	. . . . .
	. . . . .	. . . . .	141,143;||Sp.148-150,154,155; . . . . .	. . . . .	. . . . .	||Sp.19,21, . . . . .	. . . . .	. . . . .	. . . . .	43;E.48,49,50. . . . .	. . . . .
	. . . . .	. . . . .	Po.160,161,162,163,164,166,. . . . .	. . . . .	. . . . .	22,23 . . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .
	. . . . .	. . . . .	169,170,171,173,176-187 . . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .

1) Although the year of observation is not known, several of these records could be classified in the periods distinguished in Tab 3.

Table 3a. Numbers of records, arranged according to species, areas, and periods;

N, northern area; C, central area; S, southern area.

	De				Ud	Ca				Uca	Le				Cm				Ucm	Er	Ue	Un			Ut	Total per area per period			Total general- per period					
	N	C	S	Total		N	N	C	S		Total	N	N	C	Total	N	C	S				Total	N	N		N	N	C		Total	N	N	C	S
- 1700	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	4	-	4	2	7	-	-	7					
1701 - 1750	-	1	-	1	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	2	2	4	-	3	3	-	6					
1751 - 1800	5	4	-	9	-	-	1	-	1	-	-	-	-	-	-	-	-	-	-	1	2	-	2	1	9	5	-	14						
1801 - 1850	1	2	1	4	1	7	-	-	7	-	-	-	-	-	-	-	-	-	-	5	2	-	2	-	16	2	1	19						
1851 - 1900	2	5	1	8	-	8	3	11	22	2	-	-	-	7	1	1	9	-	-	2	3	-	3	-	24	9	13	46						
1901 - 1950	12	28	6	46	1	25	8)+)50	3	36)+)50	2	17	1	18	6	-	-	6	1	-	4	12	-	12	3	83	37)+)50	9	129)+)50						
1951 -	70	42	4	116	9	23		13)	20	56)	-	6	-	6	1	-	1	2	1	1	1	19	2	21	2		133	57)	25	215)				
no date	-	2	2	4	1	1	10	6	17	-	-	1	1	2	1	3	6	-	-	1	6	-	6	-	11	14	11	36						
Total per species per area	90	84	14	188	12	64	85	40	189	5	23	2	25	16	2	5	23	2	1	15	50	4	54	8	286	177	59	522						

Table 3b. Numbers of records, arranged according to species, areas and decennia from 1851 to 1970.

	De				Ud	Ca				Uca	Le				Cm				Ucm	Er	Ue	Un			Ut	Total per area per decennium			Total general per decennium
	N	C	S	Total		N	N	C	S		Total	N	N	C	Total	N	C	S				Total	N	N		N	N	C		Total	N	N	C	S
1851 - 1860	-	-	-	-	-	1	-	-	1	1	-	-	-	2	-	-	2	-	-	-	-	-	-	-	4	-	-	4	
1861 - 1870	-	1	-	1	-	2	-	-	2	-	-	-	-	-	-	-	-	-	-	1	2	-	2	-	5	1	-	6	
1871 - 1880	2	2	1	5	-	-	-	1	1	1	-	-	-	1	-	-	1	-	-	1	1	-	1	-	6	2	2	10	
1881 - 1890	-	-	-	-	-	1	-	2	3	-	-	-	-	4	-	-	4	-	-	-	-	-	-	-	5	-	2	7	
1891 - 1900	-	2	-	2	-	4	2	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	4	-	8	
1901 - 1910	2	2	2	6	-	-	-	-	-	-	-	-	-	1	-	-	1	-	-	-	-	-	-	1	4	2	2	8	
1911 - 1920	3	2	-	5	-	-	2	-	2	-	1	-	1	-	-	-	-	-	-	-	-	-	-	1	5	4	-	9	
1921 - 1930	2	12	-	14	-	4	2	-	6	1	6	1	7	-	-	-	-	-	-	-	5	-	5	1	19	15	-	34	
1931 - 1940	-	8	2	10	-	8	2))	-	10))	-	4	-	4	5	-	-	5	1	-	-	4	-	4	-	22	10))	2	34))	
1941 - 1950	5	4	2	11	1	12	2))																						

Table 4. *Dermochelys coriacea* (L.), individual records per month, and indicating whether the turtle was alive or dead, indicating the country; with regard to the dead specimens s indicates a stranded carcass, f a carcass floating at sea; the numbers are those of the series De; for further abbreviations, see Table 2.

	Northern Area			Central Area			Southern Area	
	Alive	Dead	Alive ? Dead ?	Alive	Dead	Alive ? Dead ?	Alive	Dead
January	-	Sw 70s	-	-	-		-	
February	-	Sc 28f; E 59s	E 57	F 142	-		-	
March	-	F 77s	-	-	-		Po 154	
April	-	E 46s	-	F 86; Sp. 147 ter	-		-	
May	-	Ne 74f	-	F 90, 97	-		Po 158	
June	W 36; E 47; Ir 65; F 79, 80, 81	-	-	F 82, 85, 88, 99, 111a, 123, 131, 134, 140, 148	F 104s		Po 156, 159	
July	No 4; Sc 17, 25; W 42a; E 48, 49, 49 bis; Ir 63 bis; Ne 75	-	-	F 98, 100, 101, 111, 122, 129, 133, 135, 136, 137, 138, 144	F 102s, 114s		Sp 150	Po 160f
August	No 5, 6, 9; Sc 12, 13, 20, 21, 22; W 32 bis, 37a, 40, 42b, 42c; E 45; Ir 63, 66	Sc 16s, 23s; G 71s; Ne 73s Ir 62s	-	F 93, 95, 107, 109, 110, 112, 113, 118, 126, 139, 141		F 127s	Sp 152	
September	No 2, 3, 7, 10; Sc 11, 15, 18, 24; W 37b, 37c, 37d, 39, 41, 44; E 31, 32, 52; Ir 64; D 68	F 78s	-	F 83, 84, 94, 108, 115, 116, 119a - 1191, 125, 132			Po 162	
October	No 8; Sc 14, 19s, 30; W 38, 42d, 43; E 55, 56; G 72; F 76	Ic 1 f; Ir 67s	-	F 117, 143; Sp 147, 148 ter	F 120s			
November	Sc 29; E 60, 61	W 33s; E 53f, 58s	-	Sp 149		Sp 147 bis s		
December	-	D 69s	-	F 145				
Month not known	W 35 (late summer); E 50, 51	Sc 26s (iv-v), 27s; W 34s; E 54s	-	F 87, 88, 91, 92, 93, 103 106 (summer), 126, 124, 128, 148, 148 bis	F 105s, 130f (summer)		Sp 151, 153; Po 155, 157, 161, 163	

Table 5. Dermochelys coriacea (L.), numbers of records in the three areas, in the various months of the year, and taking to account whether the specimens were alive or dead.

Month	Northern area				Central area				Southern area		
	Alive	Dead	Alive ? Dead ?	Total per month	Alive	Dead	Alive ? Dead ?	Total per month	Alive	Dead	Total per month
January	-	1	-	1	-	-	-	-	-	-	-
February	-	2	1	3	1	-	-	1	-	-	-
March	-	1	-	1	-	-	-	-	1	-	1
April	-	1	-	1	2	-	-	2	-	-	-
May	-	1	-	1	2	-	-	2	1	-	1
June	6	-	-	6	10	1	-	11	2	-	2
July	9	-	-	9	12	2	-	14	1	1	2
August	16	5	-	21	11	-	1	12	1	-	1
September	19	1	-	20	20	-	-	20	1	-	1
October	11	2	-	13	4	1	-	5	-	-	-
November	3	3	-	6	1	-	1	2	-	-	-
December	-	1	-	1	1	-	-	1	-	-	-
Month not known	3	4	-	7	12	2	-	14	6	-	6
	67	22	1	90	76	6	2	84	13	1	14
	74.4%	24.4%	1.1%	100%	90.5%	7.1%	2.4%	100%	92.9%	7.1%	100%

Table 6. Dermochelys coriacea (L.), total length, length of carapace, and weight (underlined measurements are those as originally published).

De, no.	Sex	Total length		Length of carapace		Weight	
		cm	inches	cm	inches	kg	lb
49 bis	♀	<u>172</u>	<u>67 $\frac{3}{4}$</u>	<u>135</u>	<u>53 $\frac{1}{8}$</u>	<u>244 1)</u>	<u>494</u>
90	?	<u>175</u>	<u>68 $\frac{7}{8}$</u>	-	-	<u>262</u>	<u>578</u>
30	♀	<u>178</u>	<u>70 $\frac{7}{8}$</u>	-	-	<u>313</u>	<u>690</u>
7	♀	<u>185</u>	<u>72</u>	<u>144.5</u>	<u>56 $\frac{7}{8}$</u>	<u>396</u>	<u>873</u>
20	♂	<u>187</u>	<u>73 $\frac{1}{2}$</u>	<u>138.5</u>	<u>54 $\frac{1}{2}$</u>	<u>241</u>	<u>532</u>
63 bis	♂	<u>190</u>	<u>74 $\frac{3}{4}$</u>	<u>142.5</u>	<u>56</u>	<u>267</u>	<u>589</u>
147 ter	?	<u>192</u>	<u>75</u>	<u>151</u>	<u>59 $\frac{1}{2}$</u>	-	-
29	♀	<u>193</u>	<u>76</u>	<u>154</u>	<u>60</u>	<u>350</u>	<u>772 2)</u>
5	♂	<u>188 + ...3)</u>	<u>74 + ...</u>	<u>162.5</u>	<u>64</u>	<u>400</u>	<u>881</u>
158	?	<u>241</u>	<u>94 $\frac{7}{8}$</u>	-	-	<u>412.6</u>	<u>910</u>
73	♂	<u>244</u>	<u>96</u>	-	-	<u>485</u>	<u>1069</u>

1) After having been injected with one gallon of formaline 10%, the specimen weighed 240 kg; for the formalin 16 kg has been deducted.

2) This weight was ascertained by weighing the parts of the turtle and adding an estimated weight for the loss of blood.

3) Length to posterior tip of carapace; considering that the specimen was a male the total length will be considerably longer.

Table 7. Caretta caretta (L.), individual records per month, indicating whether the turtle was alive or dead, and indicating the country where found; the numbers are the serial numbers in the series Ca; for abbreviations see Table 2.

	Northern area			Central area		
	Alive	Dead	Alive ? Dead ?	Alive	Dead	Alive ? Dead ?
January	Sc 7; E 20	-	-	F 136, 137	-	F 63, 69
February	Sc 6; W 18; E 25	CI 37, 38	-	-	-	F 70, 77
March	-	-	Ir 46	-	-	F 86
April	Ir 42	Ir 51	-	Sp 142, 146	-	-
May	E 35;	F 62	Ir 44	F 74	-	-
June	-	-	-	F 68; Sp 144	-	-
July	Sc 11; E 30	-	-	Sp 145	-	-
August	Sc 12; W 15; E 21, 23, 24; NJ 40	-	-	F 65, 67	-	-
September	W 16; E 27; Ir 43, 47	Sc 4	-	-	-	-
October	E 13; Ir 53; D 54 bis	Ne 57	-	-	-	-
November	E 22, 31; CI 39; Ir 45; P1 55	Sc 5; E 19	-	F 81, 82, 83	-	-
December	Sc 3, 8, 9, 10; W 17; E 28, 32, 33, 34; Ir 50; Ne 59	No 2; E 29; CI 36 Ne 56	-	-	-	-
Month not known	R 1; E 26; Ne 58	E 26 bis	E 14; Ir 41, 48, 49, 52, 54; B 60, 61	F 76, 78, 79, 80, 84, 85, 88-135; Sp 139, 143, 147	-	F 64, 66, 71, 72, 73, 75, 87; Sp 138, 140, 141

Table 8. Caretta caretta (L.), numbers of records per month and per area, indicating whether the specimen was alive or dead.

Month	Northern area				Central area		
	Alive	Dead	Alive ? Dead ?	Total per month	Alive	Alive ? Dead ?	Total per month
January	2	-	-	2	2	2	4
February	3	2	-	5	-	2	2
March	-	-	1	1	-	1	1
April	1	1	-	2	2	-	2
May	1	1	1	3	1	-	1
June	-	-	-	-	2	-	2
July	2	-	-	2	1	-	1
August	6	-	-	6	2	-	2
September	4	1	-	5	-	-	-
October	3	1	-	4	-	-	-
November	5	2	-	7	3	-	3
December	11	4	-	15	-	-	-
Month not known ?	3	1	8	12	57	10	67
	41	13	10	64	70	15	85

Table 9. *Caretta caretta* (L.), comparison of measurements of the carapace, taken along the curve and taken between perpendiculars.

Locality	Reg. number	Length in mm		$\frac{a-b}{a}$		Width in mm		$\frac{c-d}{c}$		Width x 100	
		$\frac{a}{\text{curved}}$	$\frac{b}{\text{straight}}$	in mm	in % of $\frac{a}{\text{curved}}$	$\frac{c}{\text{curved}}$	$\frac{d}{\text{straight}}$	in mm	in % of $\frac{c}{\text{curved}}$	$\frac{\text{Length}}{\text{curved}}$	$\frac{\text{Length}}{\text{straight}}$
Loc.?	RMNH 6208	182	159.8	22.2	12.2	175	140.1	34.9	19.9	96.1	87.7
Algeria	RMNH 6181	-	-	-	-	186	154	32	17.2	-	-
Loc.?	RMNH 16805	217	196.9	20.1	9.3	207	159.6	47.4	22.9	95.4	81.0
Lacanau-Océan, Ca 76	RMNH 17026	230	198.2	31.8	13.8	204	164.5	39.5	19.4	88.7	83.0
Perranporth, Ca 22	Mus. Truro	235	203.7	31.3	13.3	207	172.5	34.5	16.7	88.1	84.7
Noordwijk, Ca 57	RMNH 10674	225	205.5	19.5	8.7	220	170	50	22.7	97.8	82.7
Arinaga, Gran Canaria	RMNH 14352	246	221	25	10.2	227	187	40	17.6	89.8	84.6
Mar Grande di Taranto	Dr.L.Capocaccia, in litt.	355	300	55	15.8	355	315	40	11.3	100	105
Madeira	RMNH 14354	369	345	24	6.5	358	302	56	15.6	97.0	87.5
Madeira	RMNH 14355	445	416	29	6.5	417	366	51	12.2	93.7	88.0
Surinam	RMNH 6182	440	422	18	4.1	410	358	62	15.1	93.2	84.8
43° 04'N, 32° 35'W	RMNH 13950	510	433.7	76.3	15.0	478	398	80	16.7	93.7	91.8
Sardinia	RMNH 6183	465	441	24	5.2	440	356	84	19.1	94.6	80.7
Madeira	RMNH 14353	518	498	20	3.9	494	382	112	21.9	95.4	76.7
Madeira	RMNH 14356	540	500	40	7.4	515	462	53	10.3	97.2	92.4
Loc.?	RMNH 16806	613	549	64	10.4	593	515	78	13.1	96.7	93.8
Azores (captivity)	Barth (1964: 10, 12)	620	562	58	9.3	590	500	90	15.2	95.2	89.0
Surinam	RMNH 13939	623	568	55	8.8	585	482	103	17.6	93.9	84.8
Madeira	RMNH 14357	630	589	41	6.5	-	-	-	-	-	-
Leghorn	RMNH 10673	640	625	15	2.3	620	475	145	23.4	96.9	76
Marmaris, Turkey	RMNH 16779	682	655	27	3.9	630	522	108	17.1	92.4	79.7
Leghorn	RMNH 10672	835	810	25	3.0	760	610	150	19.5	91.0	75.3
River Lune, Ca 13	BM 1929.12.3.1	965	908	57	5.9	876	712.5	163.5	18.7	90.8	78.5
Ouddorp, Ca 59	RMNH 10671	1000	965	35	3.5	910	765	145	15.9	91	79.3
Curaçao	RMNH 17027	1080	1020	60	5.6	945	790	155	16.4	87.5	77.4

Table 10, Caretta caretta (L.), length of carapace in size classes of 25 mm; (c) indicates measurements taken along the curve.

Length of carapace in mm	Northern area		Central area		Southern area	
	Serial number, Ca:	Number of specimens	Serial number, Ca:	Number of specimens	Serial number, Ca:	Number of specimens
151 - 175	5 (c), 47	2	64, 69, 73	3	-	-
176 - 200	6, 21, 23, 24, 25, 36, 38, 46, 50	9	68, 76, 83, 87, 138	5	154	1
201 - 225	3, 9, 22, 31, 37, 42, 44, 54, 56	9	82	1	-	-
226 - 250	7, 10, 28, 49	4	81	1	151	1
251 - 275	-	-	67, 74, 86, 142	4	-	-
276 - 300	-	-	80	1	152	1
301 - 325	30, 45	2	-	-	155	1
326 - 350	4, 40	2	-	-	-	-
351 - 375	-	-	-	-	156	1
376 - 400	11	1	-	-	-	-
401 - 425	18	1	-	-	-	-
426 - 450	35	1	-	-	-	-
451 - 475	-	-	-	-	-	-
476 - 500	12	1	-	-	172	1
501 - 525	33	1	-	-	-	-
526 - 550	62	1	145	1	-	-
551 - 575	14	1	-	-	159	1
576 - 600	-	-	-	-	-	-
601 - 625	53	1	-	-	-	-
626 - 650	32	1	-	-	158	1
651 - 675	-	-	-	-	-	-
676 - 700	-	-	-	-	-	-
701 - 725	-	-	-	-	-	-
726 - 750	-	-	-	-	157	1
751 - 775	-	-	63	1	-	-
776 - 800	2	1	-	-	-	-
801 - 825	-	-	-	-	-	-
826 - 850	-	-	-	-	-	-
851 - 875	-	-	-	-	-	-
876 - 900	20 (c?)	1	72	1	-	-
901 - 925	13; 19 (c)	2	-	-	-	-
926 - 950	-	-	-	-	-	-
951 - 975	59	1	-	-	-	-
976 -1000	-	-	-	-	-	-
1001 -1025	-	-	-	-	-	-
1026 -1050	8 (c)	1	-	-	-	-

Table 11. Caretta caretta (L.), Length of carapace and weight;
(c), measurements taken along the curve.

Specimen	Length of carapace		Weight	
	inches	mm	lb.	oz.
Ca 50	7 $\frac{1}{2}$	190.5	2	7 $\frac{1}{2}$
Ca 4	13 $\frac{1}{2}$	343	12	-
Ca 18	15 $\frac{7}{8}$	404	18	1 $\frac{1}{2}$
Barth (1964: 12) ♀	22 $\frac{1}{8}$	562	67	4
Ca 2	30 $\frac{15}{16}$	785	109	2
Baldwin & Lofton ♀	33 $\frac{1}{4}$	845	193	-
Ca 17	-	-	61 $\frac{1}{4}$	-
Ca 20	35 (c)	889 (c)	+ 200	-
Baldwin & Lofton ♀	+ 35	+ 890	257	-
Baldwin & Lofton ♀	35 $\frac{3}{4}$	918	218	-
Baldwin & Lofton ♀	36 $\frac{1}{2}$	927	262	-
Ca 58 ♀	38	965	616	-
Baldwin & Lofton ♀	39	990	298	-
Ca 8 ♀	41 (c)	1041 (c)	309	-

1) Total length 4 ft. 9 $\frac{3}{4}$ in. (1467 mm); See: IIC, Caretta caretta (L.),
discussion.

2) See: IIC, Caretta caretta (L.), discussion.

Table 12, *Caretta caretta* (L.), measurements of vertebral scutes, in mm; italics: scutes longer than wide.

Locality	Reg. number	Length of carapace	1st Vertebral		2nd Vertebral		3rd Vertebral		4th Vertebral		5th Vertebral	
			long	wide	long	wide	long	wide	long	wide	long	wide
Loc.?	RMNH 6208	159.8	20.2	35.4	31.0	43.0	30.9	52.8	32.7	44.7	32.4	33.8
Algeria	RMNH 6181	-	23.7	34.1	36.9	40.0	33.2	49.1	34.7	44.9	34.2	36.5
Loc.?	RMNH 16805	196.9	27.1	39.4	37.3	45.5	37.7	55.3	40.9	52.7	38.4	42.9
Lacanau-Océan, Ca 76	RMNH 17026	198.2	26.6	36.9	39.6	37.6	40.6	47.7	47.6	48.5	38.1	44.0
Perranporth, Ca 22	Mus. Truro	203.7	28.1	42.2	39.7	53.6	37.2	67.8	41.6	56.3	41.1	43.6
Noordwijk, Ca 57	RMNH 10674	205.5	33.5	42.4	42.8	51.4	40.0	54.2	42.3	55.8	44.1	47.3
Le Grouin Pt., Ca 37	Jersey Museum	217	28.0	49.6	43.0	58.0	42.1	64.5	45.5	63.3	39.6	45.4
Arinaga, Gran Canaria	RMNH 14352	221	31.5	47.9	45.6	56.4	43.0	65.6	43.7	64.0	40.1	44.2
Madeira	RMNH 14354	345	42.9	72.4	70.9	69.7	65.0	77.4	72.5	88.3	65.8	78.2
Madeira	RMNH 14355	416	56.8	79.7	82.5	74.1	76.6	82.4	81.4	91.1	73.8	82.8
Surinam	RMNH 6182	422	51.3	85.9	89.9	80.8	76.5	90.5	83.3	98.3	74.5	85.0
43° 04' N, 32° 35' W	RMNH 13950	433.7	66.2	90.9	97.9	78.2	80.5	91.0	92.4	94.6	83.3	99.7
Sardinia	RMNH 6183	441	55.5	74.0	86.7	72.3	79.0	82.7	86.5	86.7	82.0	88.8
Madeira	RMNH 14353	498	63.7	90.8	90.6	75.5	92.8	86.2	102.5	97.5	86.5	104.6
Madeira	RMNH 14356	500	61.8	98.0	99.6	97.6	95.9	109.2	96.0	118.6	98.0	123.2
Irish Sea, Ca 14	Museum York	505	70.8	102.2	111	95.6	109.2	105.2	110.4	111.6	124.1	127.3
Felpham, Ca 33	BM 1940.3.16.1	512	68	89.8	103.3	81.9	93.6	90.7	97.1	94.8	90	112
Mousehole, Ca 62 bis	Mus. Truro	-	-	-	104	ca.82	99.5	ca.90	104.0	108.4	106.6	87.6
Loc.?	RMNH 16806	549	77.4	91.2	117.5	89.5	106.2	97.2	112.5	116.0	101.3	114.7
Surinam	RMNH 13939	568	89.4	103.4	112.0	94.0	106.1	105.0	116.0	114.8	111.0	122.8
Madeira	RMNH 14357	589	77.2	93.2	122.1	81.0	109.3	89.5	129.5	97.4	93.0	129.2
Leghorn	RMNH 10673	625	81.0	97.5	117.0	89.1	117.8	97.8	118.9	106.8	101.1	112.6
Bognor Regis, Ca 32	BM 1940.3.17.1	641	82.0	101.2	127.0	99.0	111.5	107.0	123.0	139.8	121.5	117.7
Marmaris, Turkey	RMNH 16779	655	90.2	90.7	121.4	99.6	133.0	94.2	129.5	106.8	106.7	139.8
Leghorn	RMNH 10672	810	93	112	143.5	98.2	152.0	103.5	167.5	105.7	135.5	171.0
River Lune, Ca 13 1)	BM 1929.12.3.1 ♂	908	111.0	154.5	172.0	128.5	172.5	150.0	178.0	164.0	137.5	196.0
Ouddorp, Ca 59	RMNH 10671 ♀	965	121.0	131.5	166.0	115.4	174.5	124.5	202.8	139.4	178.1	203.5
Curaçao	RMNH 17027	1020	146.0	130.8	180.5	124.7	182.7	127.3	178.7	129.3	226.5	210.0

1) An additional vertebral (length 56.0 mm, wide 93.0 mm), wedged in between the fourth and fifth vertebrae

Table 13. Caretta caretta (L.). Growth as expressed by the increasing length of the carapace (in mm.).

	Sachsse, 1970: 89	Cadenat 1957b: 1372	G.H. Parker, 1926: 422; 1929: 371	S.F.Hildebrand & Hatsel 1927: 376	Flower 1937.
5 months	96	-	-	-	-
6 months	113	-	80	-	-
7 months	128	-	-	-	-
8 months	136	-	-	-	-
9 months	147	-	-	-	-
9 m. 25 d.	-	111	-	-	-
10 months	158	-	-	-	-
10 m. 20 d.	-	116	-	-	-
11 months	168	-	-	-	-
11 m. 20 d.	-	128	-	-	-
12 months	178	-	-	136	-
12 m. 20 d.	-	144	-	-	-
13 m. 21 d.	-	149	-	-	-
1½ years	-	-	254	-	-
x (2 years?)	-	-	-	-	200
2½ years	-	-	410	-	-
2 y. 7 m.	-	-	-	460	-
3 years	-	-	-	530	-
3½ years	-	-	583	-	-
4½ years	-	-	740	538	-
x + 14 y.	-	-	-	-	610
x + 16 y.	-	-	-	-	+ 670
x + 23 y.	-	-	-	-	700

Table 15. Caretta caretta (L.), growth in weight, after data published by Prince Albert I of Monaco (1898a: 10-11; 1932b: 280) and Richard (1900: 110; 1910: 153). (In the age columns x is the unknown age at which the weighing started).

Date of weighing	Weight in kg	Age x +	Weight in kg	Age x +	Weight in kg	Age x +
23.viii.1895	-	-	2.300	-	-	-
3.ix.1896	-	-	-	-	23.100	-
26.iii.1897	-	-	4.-	1y. 7 m. 3 d.	25.600	6 m. 23 d.
7.iv.1897	-	-	4.-	1y. 7 m.12 d.	25.500	7 m. 4 d.
25.iv.1897	-	-	4.-	1y. 8 m. 2 d.	25.500	7 m. 22 d.
28.v.1897	-	-	4.-	1y. 9 m. 5 d.	26.100	8 m. 25 d.
23.vii.1897	0.680	-	-	-	-	-
18.ix.1897	1.200	1 m. 26 d.	5.100	2y. 26 d.	30.380	1y. 15 d.
5.xi.1897	1.300	3 m. 13 d.	5.200	2y. 2 m.13 d.	34.100	1y. 2 m. 2 d.
15.xii.1897	1.360	4 m. 23 d.	5.300	2y. 3 m.22 d.	35.200	1y. 3 m.12 d.
1.iii.1898	2	7 m. 6 d.	-	-	-	-
9.iv.1901	-	-	-	-	44.500	4y. 7 m. 6 d.
ca. i.1910	45-	12y. 6 m.	59.-	14 y. 5 m.	-	-

Table 16. Lepidochelys kempii (Garman), number of records per month, indicating whether the turtle was alive or dead, and the country where the observation was made.
For abbreviations, See Table 2.

Month	Alive		Dead		Alive ?, Dead ?		Total per month	
	numbers: Le:	numbers per month	numbers: Le:	numbers per month	numbers: Le:	numbers per month	N	C
January	-	-	W 5; E 14; Ir 19, 20	4	E 7	1	5	-
February	-	-	E 9	1	-	-	1	-
March	-	-	-	-	-	-	-	-
April	-	-	-	-	-	-	-	-
May	-	-	-	-	-	-	-	-
June	-	-	-	-	-	-	-	-
July	-	-	-	-	-	-	-	-
August	-	-	-	-	-	-	-	-
September	-	-	-	-	-	-	-	-
October	Sc 1	1	-	-	late x, or Ir 16	1	2 ¹⁾	-
November	W 3; E 12	2	E 6	1	early xi	-	3	-
December	Sc 2; W 4; E 8, 10; CI 15; Ne 22, 23	7	Ir 21	1	Ir 17	1	9	-
Month not known	E 13	1	-	-	E 11; Ir 18 F 24, 25	2	3	2
		11		7		5	23	2

1) Le 16 from late October or early November has been entered under October

Table 17, *Lepidochelys kempii* (Garman), length and width of carapace, in mm.

Specimen:	Length	Width	$\frac{W \times 100}{L}$		Reg. number	Length	Width	$\frac{W \times 100}{L}$				
			European Atlantic waters									
Le 3 or Le 4	210	204	97.1		Mus. Océanogr. Monaco 2660	99.7	98.7	99.0				
Le 2	216	197	91.2									
Le 14	218.5	219	100.2		Madeira	229.5	207	90.2				
Le 21	232	218	94.0	SMF 41057								
Le 10	235	213	90.6	MMF 3978								
Le 7	241	226	93.8	MMF 3194								
Le 5	244	224	91.8									
Le 16	245	247	100.8		American Atlantic waters	180.3	172.5	95.7				
Le 19	245	222	90.6	MCZ 1406								
Le 8	250	229	91.6	AMNH 69604								
Le 18	252	233	92.5	MCZ 45548								
Le 15	253	226.5	89.6	AMNH 2205								
Le 11	257.5	229	88.9	MCZ 46537								
Le 13	265	250	94.3	AMNH 44867								
Le 23	266	245	92.1	AMNH 28863								
Le 24	267	249	93.3	AMNH 46778								
Le 9	267	252	94.4	AMNH 44868								
Le 17	280	277	98.9	AMNH 74826								
Le 25	292	270	92.5	AMNH 74825								
Le 4 or Le 3	298	284	95.3							395	384	97.2
Le 6	304.8	292	95.8									
Le 12	346.5	336	97.0									

Chart 1

Dermochelys coriacea (L.)●

Turtles that probably were *D.coriacea* (L.)*

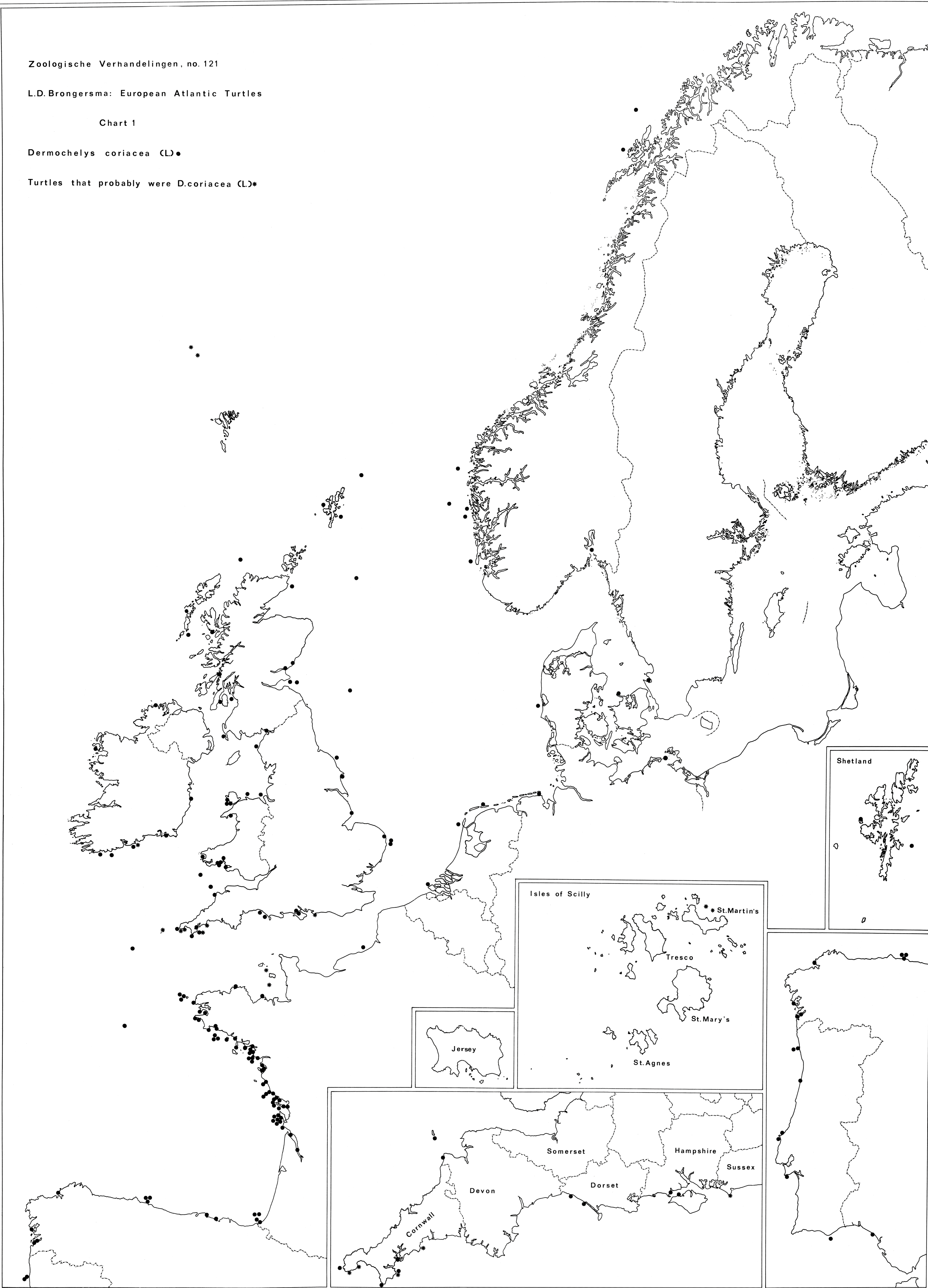


Chart 2

Caretta caretta (L.) ●

Turtles that may have been *C.caretta* (L.) *

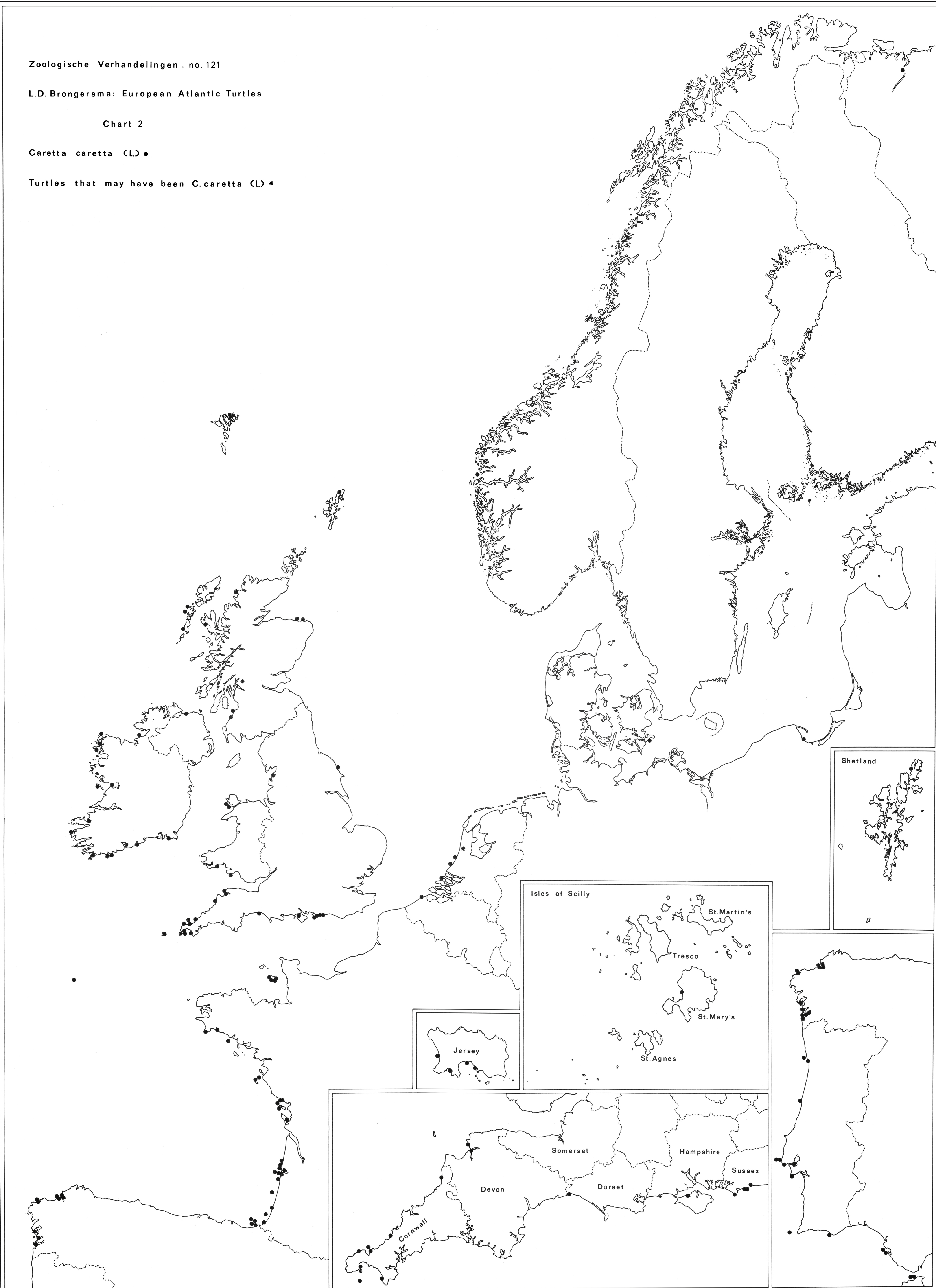


Chart 3

Lepidochelys kempii (Garman)●

Chelonia mydas (L.)★

Turtles that probably were *Ch.mydas* (L)★

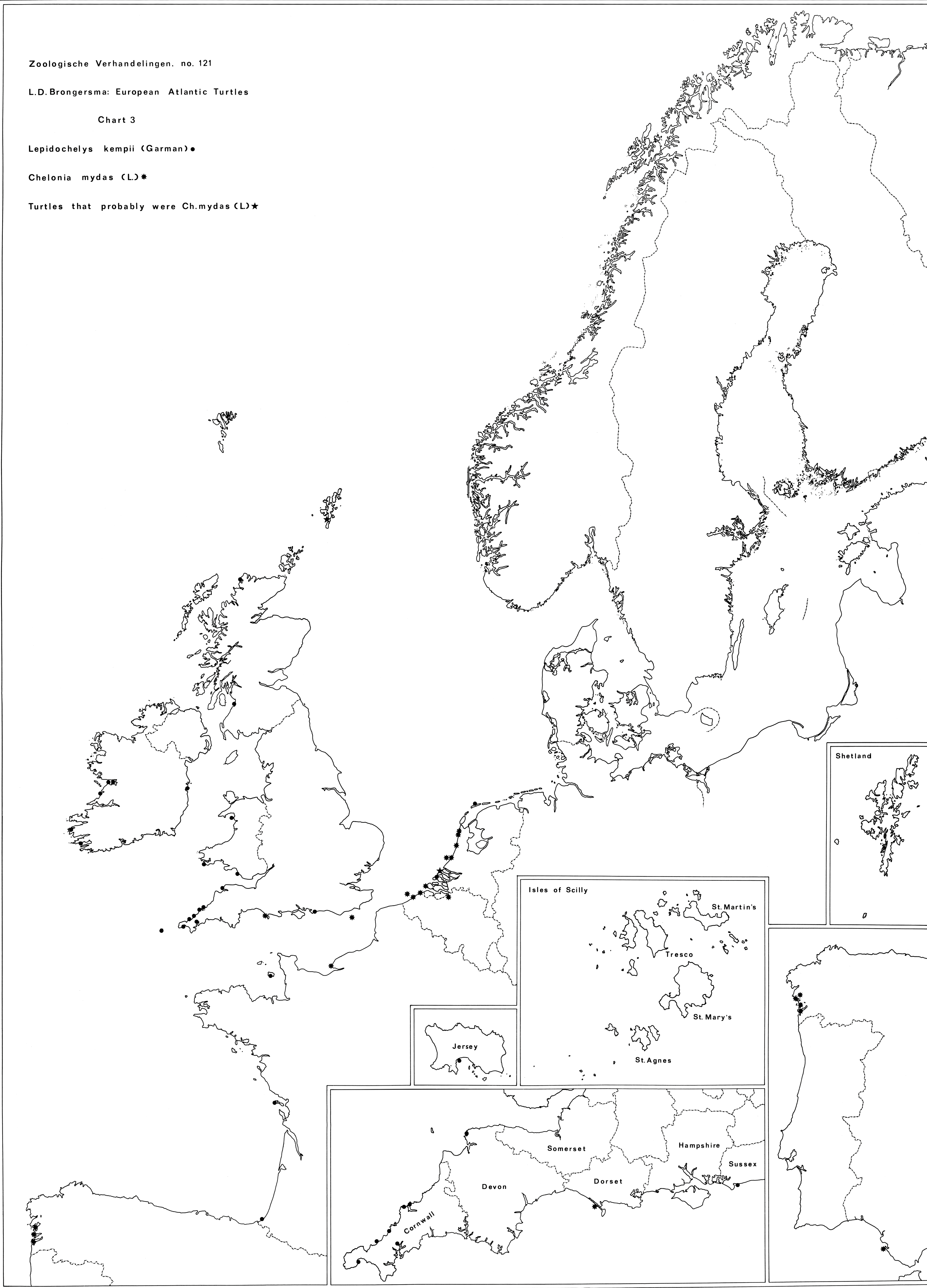


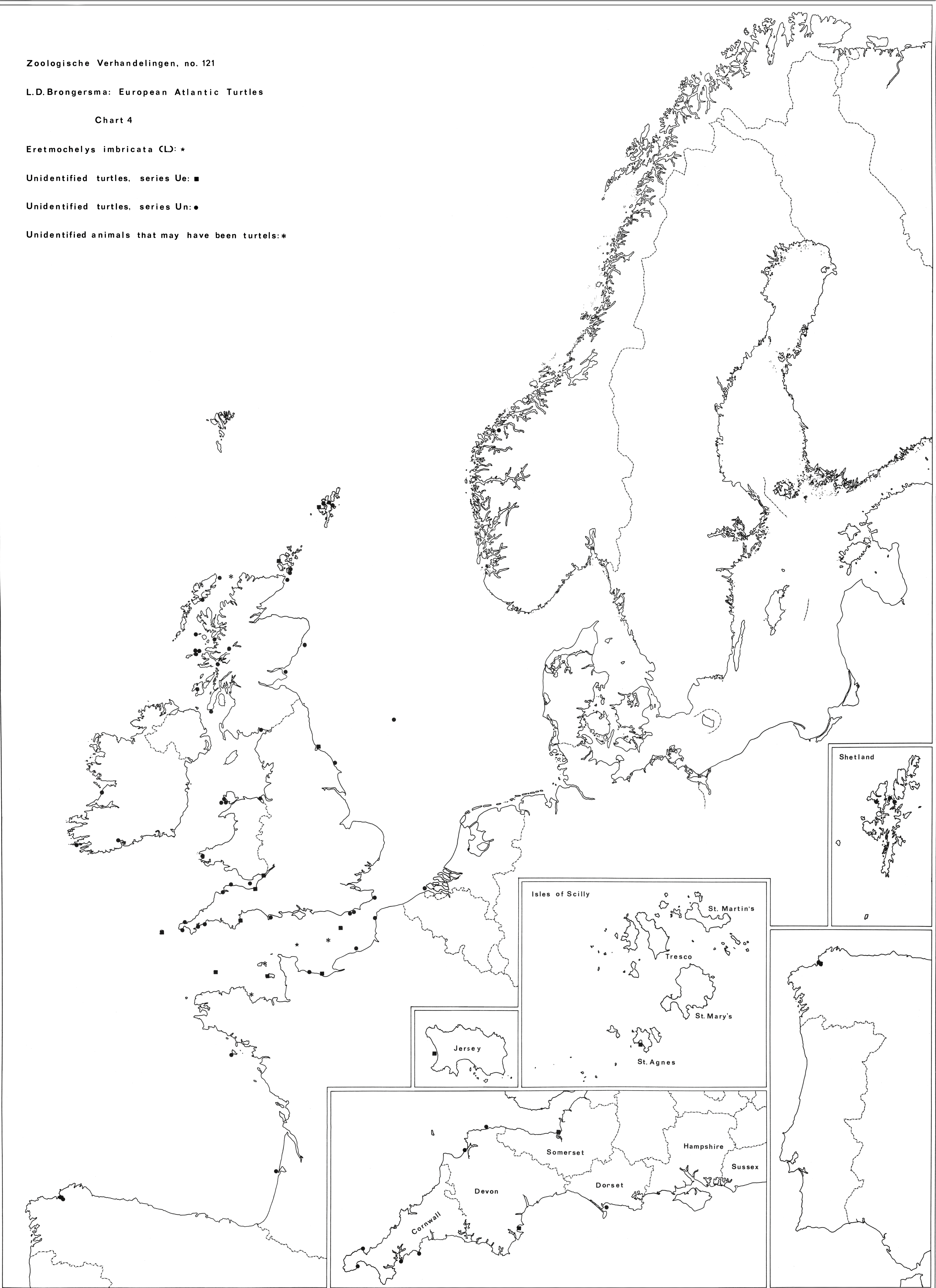
Chart 4

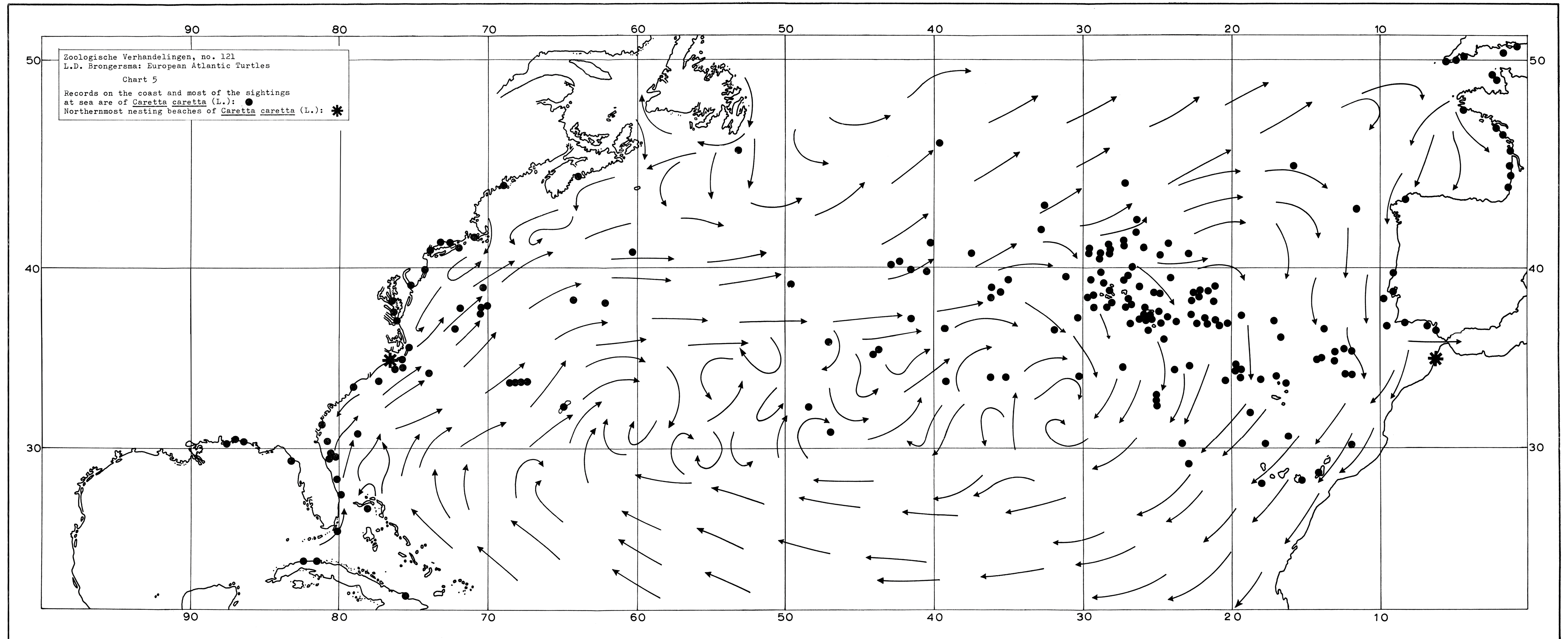
Eretmochelys imbricata (L.): *

Unidentified turtles, series Ue: ■

Unidentified turtles, series Un: ●

Unidentified animals that may have been turtles: *





Zoologische Verhandelingen, no. 121
L.D. Brongersma: European Atlantic Turtles
Chart 6
Dermochelys coriacea (L.) in the
Western North Atlantic: ●
Nesting: *

50°

40°

30°

20°

100°

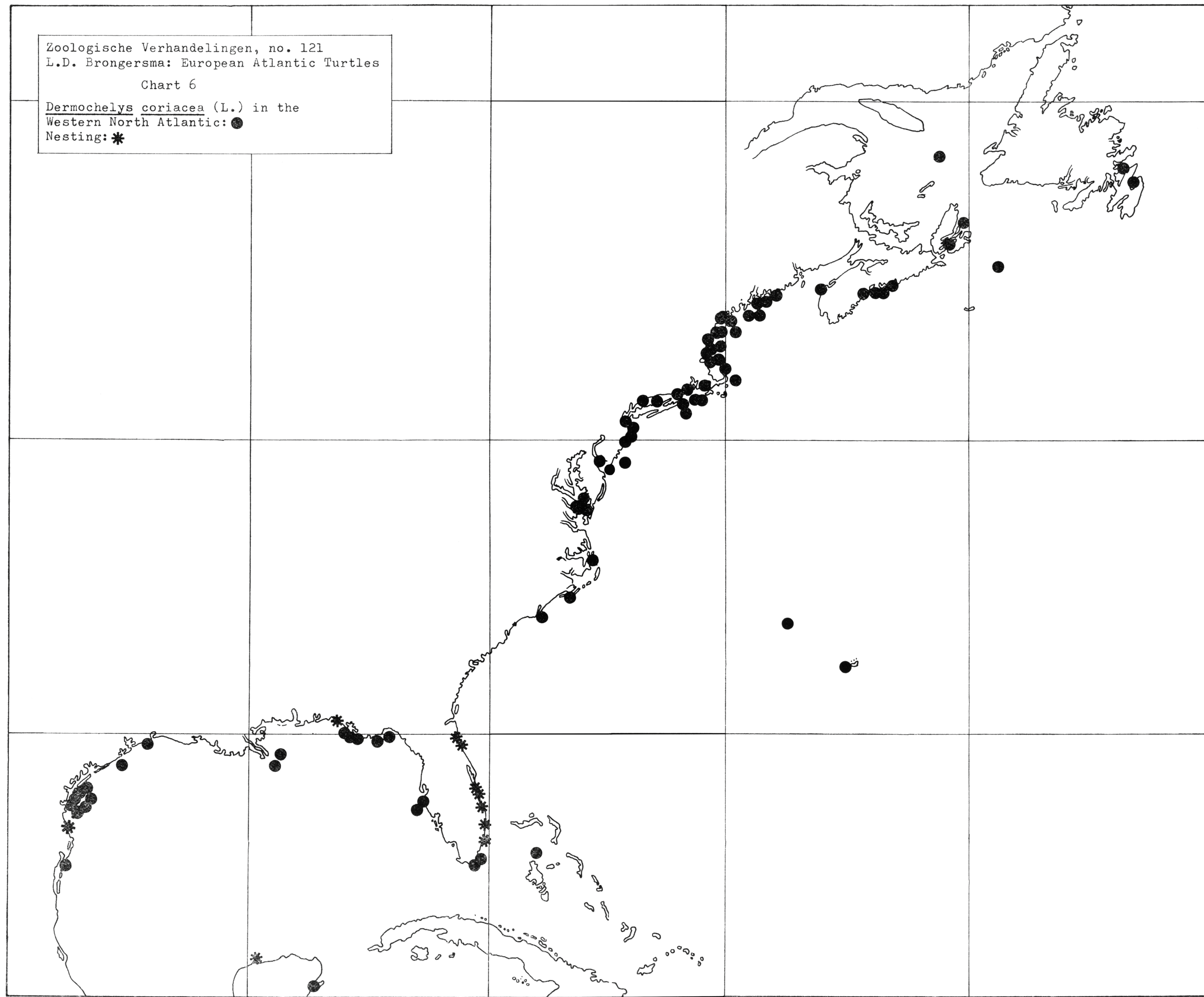
90°

80°

70°

60°

50°



Zoologische Verhandelingen, no. 121
L.D. Brongersma: European Atlantic Turtles

Chart 7

Caretta caretta (L.) in the
Western North Atlantic: ●

Nesting: ★

50°

40°

30°

20°

100°

90°

80°

70°

60°

50°

